

AVIATION WEEK

A MCGRAW-HILL PUBLICATION

AUG. 13, 1951

50 CENTS



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Any time may find the GRUMMAN ALBATROSS anywhere . . . over warm Pacific waters or at icy arctic altitudes. Designed for air rescue and other activities on the open sea, this big Air Force amphibian has earned a remarkable record for saving lives during its first year of operation.

GRUMMAN AIRCRAFT ENGINEERING CORPORATION, BETHPAGE,

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**Service records verify reliability of
this precision-built transmission**

Studies of service records at Travis, Rapid City, and Carswell Air Force Bases reveal that Sundstrand's alternator drive for the B-36 has acquired an enviable reputation for dependable performance. At Travis, for example, there was only one minor accuracy adjustment reported in more than 4500 constant speed drive hours logged on B-36's at this base. Similar records are being set

at other fields. This remarkably efficient drive—which makes possible greater use of AC power—has also proved itself that aircraft and engine designers are now incorporating it in other types of bombers, transports, fighters and engines. Special adaptations can be developed for you through Sundstrand's reliable research, expert engineering, and precision production.



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SUNDSTRAND MACHINE TOOL CO.
HYDRAULIC DIVISION, ROCKFORD, ILL.

AIRCRAFT AND INDUSTRIAL HYDRAULIC TRANSMISSIONS, PUMPS, MOTORS AND VALVES • OIL BURNER PUMPS • AIR CIRCULATORS
LATHES, MILLING, GRABBING AND SPECIAL MACHINES • SHAPING TOOLS • MAGNETIC COILS

B.F. Goodrich



New kind of fire outwears all others in airline tests

A NEW IDEA in tire construction designed to give longer service life, has been introduced by B. F. Goodrich.

Instead of the conventional rubber tread, the new tire has rows of "daylight"—wound reinforcements in the rubber.

B. F. Goodrich engineers had two things in mind in developing the new design: (1) provide better distribution of the load, and (2) reduce exposure to road cutting. In early engine tests, the results were even better than expected. Other airlines agreed to test the new tires. Various tests were tried, on DC-3s, DC-4s, and DC-6s.

This report from West Coast Airlines is typical: "We removed the tires after 400 hours, 1200 landings. In the process of stripping, we discovered that there was enough rubber left for about 1000 hours more, a total of 1500 landings. These tires have given us longer service than any we have used."

Some of the airlines that tested the new tires and are now using them as standard equipment are British, United, American Continental, Frontier, Northwest, and West Coast. Still more airlines are now testing or using. Thus now, longer wearing tire is the

latest B. F. Goodrich "Year" in innovation. Others include the first Type II Cough process, successors of the Type VII. The first Type III Cough process. The first precision precision tire. First recommendation of multiple tires for commercial use. First serious type dynamometer for tire testing. The B. F. Goodrich Company, Akron, Ohio.

B.F. Goodrich
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for use in the new
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Auburn has specialized for over seven years in turbojets, jet prop and rocket spark plugs and other aircraft ignition parts.

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EASTERN Air Lines



23 YEARS

FAFNIR

Eastern Air Lines is almost as well known for its operating efficiency as it is for its fast, exacting schedules covering better than 160,000 air flight miles daily. For over 23 years, Fafnir has had the privilege of contributing to Eastern's operating efficiency by supplying ball bearings as original equipment or replacement. But something more than just good bearings is responsible for this long association. It's an attitude and an attitude—a way of looking at ball bearings from the user's viewpoint, an attitude gained from nearly twenty-five years' specialization in aircraft ball bearings. The Fafnir Bearing Company, New Britain, Conn.



Fafnir Ball Bearing Rod Ends, one of the Fafnir Aircraft Type Ball Bearings specified by Eastern Air Lines. Fafnir Rod Ends permit a 10% weight gain in either direction. Light compact design. Outer race ground directly on shank member.



Are you taking full advantage of the constantly growing range of forgings?

Typical is this aluminum alloy forging with a projected area of more than 1,000 square inches used in the wing structure of a modern military bomber. Such forgings are today made possible by the use of the largest die forging press in America (18,000 tons). For hammer or press die forgings of aluminum, magnesium or steel, Wyman-Gordon engineers are ready to serve you—there is no substitute for Wyman-Gordon experience.

Standard of the Industry for More Than Sixty Years

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 FORGINGS OF ALUMINUM • MAGNESIUM • STEEL
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 HARVEY, ILLINOIS DETROIT, MICHIGAN

NEWS DIGEST

DOMESTIC

Shipments of complete civil planes, measured on airframe weight, rose to \$69,680 in May, 1951, the total being 346 planes valued at \$137.7 million, compared with 347 worth \$174 million in April. Total of 354 civil aircraft valued at \$23.8 million was shipped in May, compared with April shipments of 364.

R. S. S. Dickinson has been chosen to replace Group Capt. C. Clarkson as British Civil Air Attache in Washington, D. C., early next year. Dickinson, 44, joined the Ministry of Aircraft Production in 1941.

Republic RF-54F Thunderjet is a photographic reconnaissance version of the supersonic Supersonic-powered Thunderjet fitted with cameras in the nose and the engine air intake moved to the wing roots.

Personal and executive plane exports of planes worth \$1,000 lb and under (empty airframe weight) rose to 250 planes valued at \$1,978,550 as reported in the Aircraft Industries Ann. by nine companies.

Air Transport Canada, Montreal, Calif., contracted awarded, has concluded negotiations and entered two-year agreement with the International Air of Montreal.

Col Harold W. Bowman, formerly deputy chief of staff for personnel, has been named special assistant to the commanding general of Tactical Air Command, Langley AFB, Va. Col William C. Berkey will take Bowman's former post.

TWA has made rapid recovery from damage suffered when its big Boeing, 707, overland line was washed under 12 ft of water during recent Midwest floods. By July 21, the airline had received 96% of scheduled mailings in effect on July 2. By July 27, mailings had been upped to 91.5%. Loss operating point was 75% on July 16.

Martin Viking rocket set altitude record of over 130 mi. at White Sands, N. M., on Aug. 7. Soaring higher than any other single-stage missile, the five-ton Viking stayed aloft for 30 min., is estimated to have reached a peak speed of 4,100 mph. It hit the earth about 90 miles from the launching point. The previous record for a single-stage

rocket was 114 mi., set at White Sands by a Martin Gemini A-4 (V-2) on Dec. 17, 1946.

Allison Radar Corp., N. Y. C., has obtained a temporary injunction in Albany, N. Y., to prevent inventor Donald K. Allison from disposing of an airborne radar, or selling any of his designs to a third party. The corporation has also filed a complaint against the inventor to compel him to carry out the terms of contract, under which he has the first claim on the inventor to deliver to it a modified lightweight airborne radar for installation in a R-1B reconnaissance airplane. Mr. Allison was ordered to appear before the court on Aug. 15.

Stanley B. Kerensky, Jr. has been named vice president in charge of operations of Wright Aeronautical Corp., a new office created as part of a plan to enlarge the company's top management in preparation for defense production expansion.

FINANCIAL

Ryan Aeronautical Co. has proposed to stockholders an increase in authorized capital stock from 500,000 shares at \$1 per share to one million shares. The company has declared a quarterly dividend of 10 cents per share on common capital stock, payable Sept. 12 to holders of record on Aug. 22.

Glenn L. Martin Co. has arranged a \$18 million V loan to provide additional working capital for financing its expanding military production. The loan's backing at the end of the first half of 1951 was over \$114 million, with sales for the period being \$16,747,026, with income prior to adjustment of minority interests being \$508,850.

Tenn Engineering & Mfg. Co. showed net earnings of \$499,477.34 after provision for Federal income taxes on sales of \$13,500,722.46 for the six-month period ending June 30. Earnings backlog at first time was approximately \$137 million. The company has negotiated with a group of banks for a \$50 million loan.

INTERNATIONAL

Australia Naval Board has ordered a number of DeS St. Vincent to replace all weather fighters from Britain.

Consult your 1951 I.A.S.

"Aeronautical Engineering Catalog"

for complete information on an AIRBORNE

ROTORs — LINER — ROTORs
 and Tri-Tail ELECTRO-MECHANICAL
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LEADER



AVTRUC—result of combined research by Armed Forces and Chase Engineers—Designed to lead the way into forward combat areas—its land troops and supply-handling equipment were needed in the establishment of airheads—to operate from short or undeveloped fields.

Exercise Swallow proved conclusively the need for such an assault transport.

• AVTRUC—designed for the job •

CHASE AIRCRAFT CO., Inc.
WEST TRENTON, NEW JERSEY

SIDELIGHTS

Washington Notes

- ▶ Getting and retaining aircraft certificates would be revised under CAA's proposal to issue certificates of 14 months to domestic only, and renewable every two years. Based plans to convert existing "lifetime" individuals to renewable types. Sections (1) Let CAA issue certificates to active, inactive, alone or dead; (2) improve criteria for private and government pilots; (3) May U. S. competency standards to line up with the ICAO standards, expected by May 3, 1955.
- ▶ **Wesley Lee Perryman**, chairman of TWA, has been named President of Airlines at U. S. representative on the Transport Commission on Common Debt, with personal rank of ambassador.
- ▶ **John Chaboyer**, former director of aviation for Dallas, has returned to Washington as an assistant on aviation matters to D. W. Rosten, Undersecretary of Commerce for Transportation.
- ▶ **Robert Tieding**, former senator, is now a member of the Washington law firm of Devitt, Kohnke, Borer, Lewis & Barthelme, and has been assigned the Federal Air laws legal account.

Air Force

- ▶ **Richard Hodgson** has been named special consultant to Gen. Vandenberg for research and development. Hodgson, president of Chicomine Television Laboratories, last, will be associated with Lt. Gen. James Doolittle, special assistant to the chief of staff, and Dr. Louis Baltimore, top USAF scientist, on television research.
- ▶ **Air Weather Service**, part of NWS, has requested 11 U. S. units, with three new air weather groups to serve Strategic Air Command, Air Defense Command and Tactical Air Command with their different weather requirements. Major Gen. Ben 309th Air Weather Wing at Tinker AFB will serve other AF commands here.
- ▶ **Southwestern Regional Office** of AEC's air government district has been established in Atlanta, to represent AF government activities in Georgia, Alabama, South Carolina, Alabama and Mississippi.
- ▶ **Midwestern Air Procurement District** is establishing an permanent exhibit at Chicago, Milwaukee, Minneapolis, St. Louis, South Bend and Indianapolis to develop parts needed by defense plants under USAF contracts and encourage small firm production.
- ▶ **An Armed Force Information Exhibit** at William Penn Hotel, Pittsburgh, Aug. 15-17 will attract subcontractors from Pennsylvannia, Ohio and West Virginia.
- ▶ **Youngstown Municipal Airport**, Ohio, has been taken over by Air Defense Command and USAF has requested \$6 million from Congress to improve and extend the base.
- ▶ **AF will establish Missouri AFB**, West Palm Beach, Fla., and spend approximately \$6.3 million for land and new construction in soon to transfer from the state of Florida to complete Missouri, which has been turned over to the state for use as Palm Beach International Airport will be used as a base of operation by NWS.



LATEST HAWKER INTERCEPTOR—The graceful lines of new Hawker F106F interceptor are shown to advantage in the photo of the Robt-Royce team present on fighter selected in quantity by RAF. Ridge shows the triplane probably losses in antiquity photo.

Aviation Picture Highlights of the Week



ACCUMULATED SUCCANER—Four new Douglas C-47s (above), the F4U SNL (highlighted), watercraft in formation. Wings and tail are fitted with air sacs. Biplane a F4U R 1540-12.



AIRPLANE CLASSIC—New Yorker S 15 twin-engine trainer for pilots, bombardiers and navigators has two P&W Wings of 600 hp each, having three-blade Hamilton Standard constant speed props.



SUPER CONSOLE CABIN—Impressive view of the new Lockheed 1049 Super Constellation's interior (left) shows 10 ft. 2 in. ceiling for the first time. Passenger capacity is increased about 350; new pressure cabin, seats capacity is up 610. Five planes in first production model going to Eastern Air Lines story p. 10.

LIGHT TWIN—Fast-class, all-weather plane (below) powered by two 1534hp Continental engines was designed and built by Frank Crutty, T. J. Howard and Robert Wilkins at Boston. It carries 2,400 lb., cruises at over 125 mph.



"More Get-Up-and-Go!"



Long-range bombers use from
15,000 lbs. to 25,000 lbs.
of Magnesium



1940—long-range bombers
used 1,000 lbs. of Magnesium
in Engine castings and wheels

Magnesium used in 1951 Bombers:

- Fuelage skins
- Wing skins, including
 diverter system
- Control surface skins
- Bomb bay doors
- Propeller spacers
- Wall's and stiffeners
- Formers and air ducts
- Many different castings
- Needle wire
- Engine castings
- Wheels, linkages, gun barrels
- Radar, radio and
 fire control equipment

MAGNESIUM

Although it served the purpose at the time, there's nothing quite so sleek as "yesterday's" airplane. Today's planes have the kind of "get-up-and-go" that really counts. The modern bomber carries heavier loads for greater distances at higher altitudes than ever before.

Magnesium, the world's lightest structural metal, has played a vital part in the progress of air transportation. Where 1,000 lbs. of this ultra light metal were used in the 1940 bomber—now 15,000 to 25,000 lbs. are used. Today it is found in almost every part of these planes in the form of sheet, castings, extrusions and forgings. By this extensive use of magnesium the weight of these planes is as much as three and one-half tons less than

it would have been had other comparable metals been used throughout. A vital metal in air transportation today, magnesium offers even greater design improvement for tomorrow. If your aim is light weight, keep your eye on magnesium.

DOW



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WHO'S WHERE

Changes

P. W. Carr, controlling engineer, has been named administrative assistant to the general manager of Wright Aeronautical Corp.

Dwight G. Glickman has been designated assistant chief engineer for Vertec, Inc., division of the Sperry Corp. Donald G. Flynn has been appointed chief engine engineer for the Chevrolet Automatic Engine Division at Tarrytown, N. Y. N. A. Rand has been promoted to assistant to vice president engineering, Douglas Aircraft Co. Howard Abel and Henry Hord have been appointed personal assistants to the vice president-engineer of Douglas. In other moves in the company, G. B. (Bones) Marble has been named advertising manager and C. J. Miller, assistant advertising manager.

Norman A. Duffany has been designated senior research technical sales and applications engineering for the New York Air Service Co., with headquarters in Waterbury, N. Y. K. R. Durr, Jr., has been named assistant field engineering manager for Aeromarine Corp. a aircraft lease, maintenance and shipping.

John J. Stul has been made general sales manager and Joseph M. Imler has been named general traffic manager at Chicago & Southern Air Lines.



ROB'S NEW CHAIRMAN

MIT stressed engineers and both sides have agreed. Walter Gordon Whitman has officially taken up his new post as civilian chairman of the Defense Department's Research and Development Board, succeeding Whitman Winkler. During World War II, Whitman successfully headed the late defense division of the War Production Board and was chairman of NACA's subcommittee on aircraft fuels and lubricants. In 1940 he became a member of the Langley Flight of MIT, accompanying the project for several years. In 1950 he joined the fuels and lubricants committee of RDR.

INDUSTRY OBSERVER

■ Air Materiel Command is disappointed with a proposed safety technique which provided for carrying all plane fuel in wing tanks which could be dropped in an emergency procedure to avoid fire hazard in forced landings. Investigation indicated that if the tanks were dropped during emergency landings, they would follow a parabolic trajectory, and the pilot, if continued to be landing in the same direction, would fly directly into the explosion of the fuel tanks. Some consideration is now being given to a plan for external tanks which would detach away from the plane after crash landing.

■ Navy's giant Martin Mars flying boats are steadily piling up a two-mile-long queue in their run between the West Coast and Pearl Harbor that is causing some serious doubts of the future of the long-range flying boat in its career. Only flying boats the Navy now has on order for cargo work are the helicopter carrier R3Es. As soon as the expected "logs" are taken out of the prototype R3E's, new proposals and controls there will be some new airplane cargo operational tests.

■ Tipoff to the much higher horsepower (over 10,000 hp.) expected from turbo-prop engines now in design stage is the anxiety which is being shown by propeller and propeller engineers over developing various methods of attachment of the propeller to the engine to replace the conventional shaft and spline arrangement now used. Loading amount on the shaft, plus the desirability of turning controls inside, are opening research into several possible solutions of the problem.

■ Greater Explosion Suppression System for aircraft fuel tanks (Aviation Week, June 11, p. 47), was recently successfully demonstrated in an F-84 wing section at Republic Aviation's Farmingdale, N. Y., plant. Secondary tankage gas belch were fired through a wing section containing fuel and the explosion system effectively prevented an explosion. Device is marketed in the U. S. by Standard Aircraft Co., Tarrytown, N. Y.

■ General Aircraft's No. 3 plant at Elkhartsville, Ind., has received sub-contract from General Motors Corp., to make major components for the Republic F-84F sweeping jet fighter, which GMA is building under license at Kansas City, Mo.

■ Ryan Aeronautical Co. is going into volume production on engine castings for high temperature parts for jet and piston engines. Among orders so far are 600 sets of exhaust systems for Pratt & Whitney R-2800s for Convair 240 and 340 piston engine models for Pratt & Whitney R-4100 engines for all Boeing B-50 bombers and C-97 Stratofreighters on order for the USAF, experimental orders from General Electric for engine testing of J-47 jet engine exhaust laws and minor modification changes; experimental work with Douglas Aircraft and United Air Lines on engine-control exhaust duct assemblies for service test on R-2800s providing DC fuel control-control sections on new contracts for the Continental R-3400 engine powering the General Patton medium tank. Also, replacement programs are going on using continuous-control exhaust system for all the Continental Boeing Stratocruiser and most of the Convair 340s.

■ Air Force now puts total design cost for a Convair B-36 reconnaissance bomber at \$18.5 million, plus about \$2 million for replacement parts for a year. Major portion of the replacement parts is for engines. A replacement of 101% is figured for the Pratt & Whitney R-4100 engine engines and a replacement of 95% for the General Electric J-47 jet pool engines.

■ Despite heavy emphasis on J-47 jet bomber production, the program is moving slowly at the two Air Force plants which have been opened to supplement the original Boeing Wichita B-47 program. Air Force does not expect the first B-47 from the Lockheed plant at Marietta, Ga., until March, 1953, and the first B-47 from the Douglas Bessie plant at Tulsa until a month later.

Air Force-Army Fight?

Unofficial reference rivalry between Air Force and Army is thickening.

Speculation in Capitol Hill is that the fight will break into the open before long.

Navy apparently on the sidelines, as seen by observers as ignoring—or at least dodging—the Army.

The Two Key Issues

- Control of tactical aviation.
- Peace Navy and Army must pay for major Air Force build-up.

Last year, after USAF fell short of its aim in killing the tactical jet role in Korea, demands to raise armed support aviation over to the Army rose. House Armed Services Committee's chairman, Carl Vinson, announced its investigation. His aim was to get the services to acknowledge competence between themselves. With the threat of a public investigation hanging overhead, it looked as though they would, and the investigation didn't raise it.

But last week pressure for congressional hearings to settle the issue was building up again. Roy Shufeldt, who frequently speaks for the Navy, told the House:

"There can be no doubt that there is a wide difference in attitude and view as to the proper role of the services in tactical aviation, and the services have evidenced a clear inability to reach the matter by themselves."

Calls declined.

In World War II at least Army Air Forces have years to develop effective close air support for Army troops, due to its concentration on air strategy and tactics.

On the other hand, the Army's bombardment units—its "artillery"—were not trained for tactical aviation.

The Army has been the stronghold of the Air Force.

"The main trouble thing would be to return to the Army all those things relating to the close tactical air support of ground troops. The only realistic alternative would be to assign to the Marine Corps this close air support mission for the Army."

The cost to the Army and Navy of a major build-up of USAF is the key to the entire discussion at close-range sessions of Senate Appropriations Committee on the \$60-billion 1952 fiscal year budget.

Conservative members want to slash Army and Navy funds—except, perhaps, funds for Naval Air—and give the Army later this year to only one year in USAF for expansion beyond its present 91 wing goal.

Conservative Sen. Charles McNichols, chairman of the Appropriations Subcommittee on the Armed Services:

"As military is essential to defense, but this defense cannot be maintained without a sound economy."

Therefore any problem will be one of finding methods of cutting military expenditures for tactical operations in the Army and Navy which do not require sacrifice in light of modern scientific advances which have given us no atomic weapons."

Washington Observers' Outlook

A switch in the Joint Chiefs of Staff opinion of Army and Air Force versus Navy still implies absence of any pronounced view on tactical aviation. Army and Navy will vote together. At the time for decisions, in mid-October, Army and Navy will vote for relatively equal boosts in the

push of the three services. Or, if the Administration declines the advancement of goals can be postponed and slaps a new ceiling on the 1951 fiscal year budget, Army and Navy will go for relatively equal cuts for the three services.

Army's only hope of removing its equal status with USAF seems to be capturing the tactical jet role.

Navy's stake in the issue: Transfer of tactical jet to the Army would mean reinforcement of three approximately equal services. Otherwise, the prospect is a dominant USAF—and lesser Army and Navy status.

New Navy Chiefs

Air task buildup, but apparently only on paper, in the reshuffle of the Navy's top command.

A "battleship" admiral, William Forbester, replaces as events, the late Adm. Forrest Sherman, in the top spot of Chief of Naval Operations. Forbester's record of cooperation with Army and Air Force as commander of amphibious operations in the Pacific during the war was a strong point in his favor with the President. Also, he was the only leading candidate for the post who didn't figure in the 1946 investigation.

As an admiral, Adm. D. B. Duncan, transfer from a third-level post, Deputy Chief for Naval Operations, to the second spot, vice chief.

An "interruption" admiral, Vice Adm. James Fife, steps into the top spot of Deputy Chief for Operations.

Forbester's first word will be his actions. "The Navy without a top flight air arm is totally inadequate to the job the Navy has today. A concrete example of an article I read in a newspaper for the post of Vice Chief of Naval Operations, Adm. Duncan, one of the foremost critics in the Navy."

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—Katherine Johnson

House Gets \$15-Billion Air Power Budget

Slash in President's fund request is not likely to affect military aviation.

By Ben S. Lee

Present House action approving the largest U. S. peacetime military budget of all time was expected last week. The budget would allow nearly \$15 billion out of 1952 fiscal year funds for purchase of aircraft and related materials.

Although the appropriation proposal, as recommended by the House Appropriations Committee, cuts the President's overall budget of over \$57 billion by \$4.5 billion, this is not expected to affect, materially, the plans of the military for aviation procurement.

Before the slash, the annual services planned to spend for aircraft and related materials:

Army	\$1,092,000,000
Navy	\$3,446,476,000
Air Force	\$1,661,000,000
Marine Corps	\$1,661,000,000

Meanwhile, House Armed Services Committee Chairman Carl Vinson, declared in a press conference that he would ask for immediate hearings which would build the Air Force to 163 wings and give the Navy authorization to build two years in advance.

An immediate expansion for both services is imperative, he said, to America's defense. "If we are to have this force in time the decision is to allocate the necessary resources must be made immediately, and the funds should be included in the next budget to be allocated to Congress."

As recommended—Under the committee recommendation, Army is authorized to receive \$20,125,774,489, Navy, \$15,915,143,258, and the Air Force, \$19,844,128,800. This means a slash of \$5,615,121,200 to the Army, \$19,844,128,800 to the Navy and \$6,615,128 to the Air Force.

The proposal, as recommended by the House Appropriations Committee, cuts the total appropriations at \$15,915,143,258. This then will include funds to finance U. S. effort in the Korean war.

As for the Air Force, Navy and Army have indicated they expect to ask for additional funds in supplemental budgets to finance additional costs. The Korean War Funds bill will be presented to Congress at a later date.

The new, the committee said, should go far beyond previous legislation with the most powerful strike

ing force ever placed in the hands of our nation. The committee, however, asked the services for what it termed "airborne equipment and procurement program," and said that the fact that \$15 billion out of every \$19 billion requested for defense was to pay the cost of military and civilian aircraft was a "serious and deliberate" statement of intent.

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Vinson while leaving the Air Force in mind as a condition of the Air Force funds for more expansion on tactical aviation. Air Force had wanted a 75% increase to its present 91 wing strength, while Navy wanted to hold the Air Force at a 10% build-up and a greater expansion on Naval aviation. Air Force had indicated that it would go along with a considerably larger build-up of the USAF, suggesting that it was a major portion of that build-up was for tactical aviation for ground support needs.

Considerable opposition is expected to the Vinson proposal of the House war ends favorably for the Air Force. Estimates for the cost of even a 10% build-up for the Air Force has been set at approximately \$15 billion in 1952 fiscal funds and increased assets, against that such a build-up could be possible, he added.

By contrast, the Air Force had indicated that it would go along with a considerably larger build-up of the USAF, suggesting that it was a major portion of that build-up was for tactical aviation for ground support needs.

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FIRST SAIRER AIR REFUELING PHOTO

First photo of the North American Avenger F-4E Sabre jet fighter in its second refueling operation. The aircraft is being refueled by a B-29 bomber. The aircraft is being refueled by a B-29 bomber.

of prices it must be considered safe to call for inflation: "The Air Force," he said, "is now expanding from the low point of 48 wings of a year ago to the 91 wings that we hope to attain by end of fiscal year 1955."

Taken to task by Rep. George H. Mahan, chairman of the committee, for delving before the Senate recently that the U. S. had only a "dismal" Air Force, Gen. Vandenberg said, "an explosive situation prevailing in Iran, and Yugoslavia, to the uneasy situation that prevails all along the Soviet periphery," simply and effectively sponsored possible further charges, at Kozsai last week, upon U. S. air power. And, to the extent that these personnel matters draw off our air strength, they could involve a steady reduction of the means possible of our disposal for meeting one day a possible direct blow from the atom enemy."

"But we have only so much as power—the amount that can now be disclosed and quoted around the globe is perfectly limited—and, if we, as the future, should be called upon to risk, instead of situation of our present air strength, in a series of Korea-type joint plans, action across the entire air resources for performing the same job as we would," was General Vandenberg's reply.

■ **The Fies-Bellows-Hue** is the new armed services plan that is now in pendulum before the Appropriations Committee recommended as \$15 billion slash of funds for the 1952 fiscal year.



PACKET ON CIVILIAN DUTY

This Fies-Bellows-Hue, in use from the USAP to the Army Co. Co. of Canada, is the new aircraft in development of an air unit on military project deemed essential to defense, as soon being loaded.

AIR FORCE

• **Complete aircraft** funds requested in the fiscal 1952 budget include \$4,557,360,000 for 6,690 complete aircraft. Of that amount, the number, \$1,544,966,491 is required to complete projects for 3,990 planes ordered out of fiscal '51 Fourth Supplemental funds. Last January, a general upgrade in the military program was ordered and the Air Force made a down payment amounting to about 30% on the 3,092 aircraft, with authority to complete payment out of '52 funds.

Air Force budget requests due, fiscal 1952 funds include a base \$1,443,593,335 for the purchase of 5,004 aircraft which will complete the presently programmed buildup to the 95 wing structure.

• **Spares.** Fiscal '52 budget requests would allocate \$1,397,015,000 to aerial component spares and spare parts—a sum almost equal to that set aside for complete aircraft procurement.

Rep. Gen. Hines A. Shepard told the Appropriations Committee that the sum includes initial spare components and spare parts required for the operation of aircraft, aircraft for the first year. This includes all major components such as engines, engines, electronics, ammunition projectiles, etc., in sufficient quantity to establish the basic stock levels, set up distribution pipelines and modification kits, he said.

Spares engines, however, Shepard pointed out, are prepared for the entire life of the aircraft. Because of this, he

said, aircraft engines will be about 40% of the entire funds requested under spares and an additional 34% for spare engine parts. This is a total of 68% of funds requested.

• **Equipment and facilities.** Air Force wants \$1,108,977,000 transferred for building additional aircraft, equipment and facilities. "This provides money for expansion of industrial air plant and plant capacity necessary to produce the aircraft for the accelerated Air Force buildup to a 95 wing level," Shepard said.

A minimum payment was made out of 1951 Fourth Supplemental funds to start building new facilities, etc. and the balance of \$164,496,000 was deferred until fiscal 1952. Shepard said he is also making provision, to provide the 95-wing structure calls for \$144,998,000 to complete that program, he explained.

• **Guided missiles.** The Air Force requests \$130,842,000 in fiscal 1952 for the procurement of first types of guided missiles.

According to the Air Force, the funds will provide a minimum number of missiles and supporting equipment to continue in operational guided missiles program. Of the total amount set aside for missile procurement, approximately 75% is requested for complete missiles and the necessary auxiliary equipment.

NAVY

The Navy Department filed its 1952 budget calls for \$4,497,660,000 for its Bureau of Aeronautics aircraft procurement program. Of this amount, \$1,572,476,660 is for new aircraft and related procurement, \$625,943,000 is for existing programs, including research and development. In addition, Navy has requested \$450 million to finance joint aircraft procurement authorization authorized under fiscal 1951, Fourth Supplemental Budgets.

Rep. Adm. Thomas S. Connelley, Chief Bureau of Aeronautics, told the committee that Naval aviation funds were limited on a very conservative vehicle. "We are requesting funds to procure aircraft, which will be delivered by December, 1953," Connelley said, "but we estimate falls short of maintaining all of the approved funds."

"We believe, however, that any decision on the procurement of additional aircraft should be deferred until combat and production experience under existing programs can be more adequately evaluated," Connelley said. The contemplated budget represents a "colossal risk" we are taking to make it insure that the aircraft which ultimately are ordered to moderate their forces will be of the most modern and most effective types available."

• **Complete aircraft.** The Navy request for \$4,426,654,000 for aircraft procurement represents a 195% increase over corresponding amounts for 1951. This considerably the purchase of approximately 5,730 aircraft. Besides the number, approximately 500 were purchased out of fiscal 1951 Fourth Supplemental funds for which only a down payment was made. Included in the total 5,730 is a \$450 million requested for fiscal '51 procurement to liquidate prior contract authority, the Navy said.

• **Deliveries for aircraft.** Navy in fiscal 1952 asks a total of \$40,056,000 for aircraft deliveries and related program. Proposed Naval procurement of ordnance and spares is lumped together. Adm. Connelley told the committee that it was for more complete for Navy to purchase complete spares of gas parts, weapons and fire control apparatus at the same time as initial procurement.

"We have found," he said, "that if we make them [gas parts] unit quantities over a long period of time, it is much more expensive than to make these parts and get them while they are making parts."

Navy asked procurement of spare parts under "spare parts of aircraft" and requested \$127,528,000. However, \$23,011,000 originally programmed in the 1951 budget to cover additional purchase of engine spares and parts has been withdrawn pending further study.

Verifying costs for spares and parts for Navy, Marine Corps, and Naval Air Reserve operations listed in detail in the overall budget request, amount out Navy's total spares budget during the coming fiscal year to approximately \$12 billion. This amount is almost equal to that requested for complete aircraft procurement.

• **Guided missiles.** Navy asks \$15,415,000 for procurement of complete guided missiles and supporting equipment. Of this amount, \$11.5 million is allocated to guided missile procurement and \$31,913,000 is allocated for target decoy equipment.

Vice Adm. John H. Connely, Vice Chief of Naval Operations for Air, told the committee that guided missiles, as such, had not yet reached guided planes with speeds varying from 200-400 mph.

"Of the helicopters, Mr. Gen. E. L. Ford, chief of Ordnance said, "Helicopters are planned as a necessary support part (in tactical operations) and we feel it will continue to do so in our operations in the future."

The helicopter has been used primarily in Korea to move the evacuation of the wounded, to supply isolated units, and in addition, to move personnel in small numbers from one location to another in places inaccessible due to terrain or enemy action."

A single gas turbine—approximately \$20



Super Connie Orders Climb to 143

Air Force has ordered 10 Lockheed Super Constellation 1049Cs with Wright 1550 compound engines, for \$15 million. This, plus the recent order for three Super Constellation 1049Cs from Lockheed International, brings Lockheed's total order for Super Constellation backlog of Super to 42, priced at \$94,841,000. Meanwhile, Texas World Airlines, with 10 already on order, is negotiating with Lockheed for still more.

The military has at least 81 Super Constellation on order, 30 for Air Force and 51 for Navy. This includes Lockheed and Super Constellation backlog of at least 143 planes costing nearly \$150 million.

Lockheed flew the first production model recently. First deliveries go to Eastern Air Lines. Delivery on the first of Air Force's data orders will be before next March, 1955.

Air Force is conducting testing of passengers in the Super's four main cabin seats. Present Air Force Constellation carry only 34 passengers. All the 21 standard Constellation have been converted by Air Force to four-level, luxury service on its main Atlantic route.

Lockheed president Robert E. Gross says "present contracts will keep Lockheed

in line of Army aircraft funds go to helicopters in number of planes however. And wing airplanes will trade with approximately \$17.5 million allocated for their purchase. The remaining 10.5 million requested by Army is for the purchase of new aircraft, including planes with speeds varying from 200-400 mph.

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Lockheed 1049 Orders

(Of Aug. 31)

U. S. AIRLINES	10
Eastern Air Lines	10
Texas World Airlines	10
FOREIGN AIRLINES	
Air France	10
ELM Royal Dutch Airlines	10
Pakistani International	10
Airlines total	42
U. S. Air Force	51
U. S. Air Force	10
TOTAL BACKLOG	143

*TWA requesting for more.

heed buy on Super Constellation through 1957. That will give us a record of more than 10 years without a single shutdown of the transport assembly line, and the end is not in sight."

Lockheed has designed the Super Constellation for long haul of more than 400 passengers (maximum) and up to 810 (military).

Recent survey overhaul of Army aircraft as a responsibility of the Air Force only a relatively small sum of \$7,422,000 is requested by Army for aircraft maintenance. This sum is primarily for the "breakdown of spare parts and the purchase of new aircraft. All maintenance both in the U. S. and overseas," it was said.

• **Guided missiles.** Breakdown of funds for procurement of complete guided missiles by the Army is not detailed, although a total of \$245 million has been requested and development activities mainly in the field of guided missiles is noted.

Mr. Gen. W. M. M. Chief Army Research and Development declared that the \$242 million requested by Army represented a \$17-million increase over that of 1951 and a \$10-million increase over that of 1950.

NMB Asks End Of WAL Strike

Los Angeles-National headquarters of the National Maritime Board last week stepped into the strike of 100 AFL-AFL-CIO Marine Air Corps members being against Western Air Lines, angrily requesting the strikers to end their walkout.

In telegram from Executive Secretary Thomas B. Balfanz to both the union and the striking owner, the board stated it did not consider the differences between union and company such as to justify continuation of the strike.

The striking seamen in a telegram to Balfanz dropped their demand for a seven-day and three-day shift.

But they still continued on making their five-on-five alternative work schedule to a 1951 contract of a 10 followed by the company. That cost difference is about \$100,000 a year.

Balfanz reportedly asked to meet the cost themselves to get their contract under the demand WAL planes. Members also want a cost-of-living increase clause, to be mediated.

Western officials said they were ready to resume operations upon return to services of striking mechanics and crew members. It was the union's refusal.

The airline offered to withdraw the case to mediation through Federal Mediation Board. Balfanz said as soon as normal operations were resumed.

The mechanics and they would go back to work and resume operations. The company would accept itself to arbitration as soon as certified after 13 more days' action. But the company refused arbitrage against any contract to arbitrate.

Meanwhile, Western ordered striking more than 400 Western pilots, flight

officers and support personnel went into effect for the duration of the strike. With 300 mechanics on strike and 150 pilots and 300 stewardesses refusing to leave their posts, more than 1,000 members of Western's national union were asked by the airline, first in Western's 23 years of operation.

New McDonnell F3H In First Test Flight

A new model of the McDonnell F3H Phantom II fighter was tested down the runway at Lambert St. Louis Airport last week and climbed quickly into the air to begin its first flight—about 25 minutes duration. Chief Test Pilot Bob Edmonds, who has been in charge of the flight test work on other high-speed McDonnell jets was at the controls.

Confidence of McDonnell and Navy in the new airplane and its ability to operate at altitude was further reinforced by the fact that it took off for the first time at its home base, instead of going to Edwards AFB, in Mojave, the usual first jumping off place of new high speed jets.

McDonnell calls the new F3H, the Phantom, in line with its other "phantom" jet plane series, Phantom, Phantom and Phantom.

The Phantom is powered with a single Westinghouse engine, the new J-40, tested in one quarter in the 1,000 to 1,500 lb thrust power bracket.

In two hours 100 miles or so behind the scene in the landing, but instead of the wing loading edge. Drop-back of the wing appears comparable to the 15-degree sweep of the XF-88 Phantom. Wing and tail surfaces are swept.

Phantom has a high speed in its straight line, as in ground appearance, say

be another by some aircraft operators for the Douglas D-558-1 Skyrocket.

Developed by a manufacturer who already has produced one plane certified with speeds around the 3,000 mph mark (the XF-88), the new Phantom makes a promising addition to the Navy's growing stable of new high-speed jets which include other other models such as the General's XF101, Douglas NF104 and the new Phantom F3H now emerging into production status.

CAB Looks Into MWA Stock Buy

A deal for Pacific Western to buy out of Mid-West Airlines for \$64,000 in part for Civil Aeronautics Board hearings, conducted by the Mid-West Airlines annual case. Pacific and Mid-West signed a contract under which Pacific would buy MWA's assets for \$64,000.

Mid-West's affidavit was on June 1, but the company continues to fly, pending CAB disposition of the case. Pacific and Mid-West have agreed to complete their deal by July 25, after appeal completion without setting for special hearings. But CAB ordered the purchase proposal consolidated with the recent one.

Pacific Aeronautics Foundation president, Chase Watkins, says the company has arranged a credit of about \$1 million for new equipment and working capital. MWA says operations are profitable. General Electric, Boeing, Pratt & Whitney, and other aircraft manufacturers to Chicago, Denver and Fargo are all of CAB. Pacific President F. L. Hilde is tentatively said to be buying Mid-West stock.

Watkins says the company's foundation plan to fly the airplanes and the contract that goes with them as an investment only. The airline would not be subjected to any interference for purposes of security, student education, although the airline might be handy for "postgraduate investigation for the master's degree."

Extra Man-Hours

From Aeronautical Corp., San Diego, Calif., estimates it has obtained 134,000 extra man-hours of work since the start of Korean hostilities.

San Diego has been made responsible of outside production. But by July 15 only one in the San Diego area, but some are in the Los Angeles area, in Ohio, and in San Francisco and New York.

The work ranges from large, specialized machine shops to small shops of C-47 aircraft. It is making small dies for jet engine parts.

Overseas Air Coach Parley Asked

The Civil Aeronautics Board has asked Pan American World Airways and Western World Airlines to call a special meeting of North Atlantic carriers of the International Air Transport Association to discuss the air coach fare member meeting. The board has a number of coach trips and is looking for duty in the "average maximum operating capacity" of each type plane. The suggested New York-London fare is between \$225-\$235.

Board Service Captain in its letter to PAA and TWA the Board says "The Board reaffirms its advocacy of a second trans-Atlantic tourist service and expects that every effort be made to obtain agreement on such a service to begin in the spring of 1953."

As a result of the CAB action, the international airlines must agree on a new group of airlines, including Pan Am, TWA or there will be an open rate session in the North Atlantic next month.

The Board's disapproval can nullify an international airline agreement. The Board has said the airlines of the individual nations who made it.

In this case, the Board disapproved mainly due to a 14-passenger limit on air coach service.

But terms of the Bermuda agreement said that tourist limitation on with all the rest, as a so-called inter-continental agreement. In disapproving the trans-Atlantic airline effective October 1952, CAB automatically nullified the whole act of airlines, including this year's regular fare and offshore tourist agreement.

CAB objection-CAB fare rates for coach the new air coach in the North Atlantic and CAB Commercial Law Section Chief Louis Stinson says CAB even hoped coach service would begin before the October, 1952, date agreed to by the IATA conference. But, after study, the Board decided these terms of the resolution were too restrictive in one category, too vague in others.

Here are CAB objections:

- Interference with the IATA agreement for the deferred limited fare program for late next year with the North Atlantic fare agreements for 1951-1952 "temporarily restrict" the operation of airlines.
- Capacity limit. CAB says the limit of only four air coach round-trips a week for each trans-Atlantic carrier is contrary to the Bermuda Principles of 1946. The IATA opposed the limit.
- Quota system. CAB says the quota system is in violation of international air service agreements. This is based on the quota principle in U.S. airlines now based on quota system on non-Atlantic.
- Seating capacity. CAB says the agree-

North Atlantic Fare Structure

New York-London			
DATA	UNITED STATES	UNITED STATES	UNITED STATES
FARE	FARE	FARE	FARE
Y-1 (Y-1)	\$225	\$225	\$225
Y-2 (Y-2)	\$225	\$225	\$225
Y-3 (Y-3)	\$225	\$225	\$225
Y-4 (Y-4)	\$225	\$225	\$225
Y-5 (Y-5)	\$225	\$225	\$225
Y-6 (Y-6)	\$225	\$225	\$225
Y-7 (Y-7)	\$225	\$225	\$225
Y-8 (Y-8)	\$225	\$225	\$225
Y-9 (Y-9)	\$225	\$225	\$225
Y-10 (Y-10)	\$225	\$225	\$225
Y-11 (Y-11)	\$225	\$225	\$225
Y-12 (Y-12)	\$225	\$225	\$225
Y-13 (Y-13)	\$225	\$225	\$225
Y-14 (Y-14)	\$225	\$225	\$225
Y-15 (Y-15)	\$225	\$225	\$225
Y-16 (Y-16)	\$225	\$225	\$225
Y-17 (Y-17)	\$225	\$225	\$225
Y-18 (Y-18)	\$225	\$225	\$225
Y-19 (Y-19)	\$225	\$225	\$225
Y-20 (Y-20)	\$225	\$225	\$225
Y-21 (Y-21)	\$225	\$225	\$225
Y-22 (Y-22)	\$225	\$225	\$225
Y-23 (Y-23)	\$225	\$225	\$225
Y-24 (Y-24)	\$225	\$225	\$225
Y-25 (Y-25)	\$225	\$225	\$225
Y-26 (Y-26)	\$225	\$225	\$225
Y-27 (Y-27)	\$225	\$225	\$225
Y-28 (Y-28)	\$225	\$225	\$225
Y-29 (Y-29)	\$225	\$225	\$225
Y-30 (Y-30)	\$225	\$225	\$225
Y-31 (Y-31)	\$225	\$225	\$225
Y-32 (Y-32)	\$225	\$225	\$225
Y-33 (Y-33)	\$225	\$225	\$225
Y-34 (Y-34)	\$225	\$225	\$225
Y-35 (Y-35)	\$225	\$225	\$225
Y-36 (Y-36)	\$225	\$225	\$225
Y-37 (Y-37)	\$225	\$225	\$225
Y-38 (Y-38)	\$225	\$225	\$225
Y-39 (Y-39)	\$225	\$225	\$225
Y-40 (Y-40)	\$225	\$225	\$225
Y-41 (Y-41)	\$225	\$225	\$225
Y-42 (Y-42)	\$225	\$225	\$225
Y-43 (Y-43)	\$225	\$225	\$225
Y-44 (Y-44)	\$225	\$225	\$225
Y-45 (Y-45)	\$225	\$225	\$225
Y-46 (Y-46)	\$225	\$225	\$225
Y-47 (Y-47)	\$225	\$225	\$225
Y-48 (Y-48)	\$225	\$225	\$225
Y-49 (Y-49)	\$225	\$225	\$225
Y-50 (Y-50)	\$225	\$225	\$225
Y-51 (Y-51)	\$225	\$225	\$225
Y-52 (Y-52)	\$225	\$225	\$225
Y-53 (Y-53)	\$225	\$225	\$225
Y-54 (Y-54)	\$225	\$225	\$225
Y-55 (Y-55)	\$225	\$225	\$225
Y-56 (Y-56)	\$225	\$225	\$225
Y-57 (Y-57)	\$225	\$225	\$225
Y-58 (Y-58)	\$225	\$225	\$225
Y-59 (Y-59)	\$225	\$225	\$225
Y-60 (Y-60)	\$225	\$225	\$225
Y-61 (Y-61)	\$225	\$225	\$225
Y-62 (Y-62)	\$225	\$225	\$225
Y-63 (Y-63)	\$225	\$225	\$225
Y-64 (Y-64)	\$225	\$225	\$225
Y-65 (Y-65)	\$225	\$225	\$225
Y-66 (Y-66)	\$225	\$225	\$225
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Y-68 (Y-68)	\$225	\$225	\$225
Y-69 (Y-69)	\$225	\$225	\$225
Y-70 (Y-70)	\$225	\$225	\$225
Y-71 (Y-71)	\$225	\$225	\$225
Y-72 (Y-72)	\$225	\$225	\$225
Y-73 (Y-73)	\$225	\$225	\$225
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Y-94 (Y-94)	\$225	\$225	\$225
Y-95 (Y-95)	\$225	\$225	\$225
Y-96 (Y-96)	\$225	\$225	\$225
Y-97 (Y-97)	\$225	\$225	\$225
Y-98 (Y-98)	\$225	\$225	\$225
Y-99 (Y-99)	\$225	\$225	\$225
Y-100 (Y-100)	\$225	\$225	\$225

ment should act the seating density required in air coach service. Other

Government Aid Asked for Copters

Government encouragement of the helicopter development by the agency the Department of Defense, Post Office Department, CAB, CAB, and National Aeronautics Administration.

The report is prepared by a working group headed by Richard K. Wicks, CAB, and includes representatives from the armed services and CAB.

The recommendations for government aid are:

- Post Office-Continued use of helicopter for mail delivery, terminal mail in Los Angeles and Chicago area and in such additional areas as CAB certifies for helicopter service in the future.
- CAB-Continued encouragement of general helicopter and helicopter service, and authorization of similar services as other areas as required by public convenience and necessity. This study of the probable impact of the helicopter on the helicopter in air travel, in connection with future state planning and certification procedures.
- CAB-Continued collaboration with CAB in synthetic and personnel training in helicopter and in regulations, such provisions for transportation.

want the Board there's no guarantee the agency will pay for itself in the long run, the Bureau plans to do so, but it is not certain to do so. This question at a later date. CAB wants the seating density right in the members, specifically giving maximum number of seats for each type of helicopter.

• BACAC Fares-It may be hard to convince BACAC to allow increased frequency of air coach on the North Atlantic. BACAC says it is not certain to do so. BACAC is running pretty close to capacity in the past summer months and doesn't have the capacity available to expand on additional traffic that could mean a loss of revenue. BACAC is now in Geneva, London, observing. But reports are that the BACAC government still favors rapid development of an coach, to which the main transportation route and especially to BACAC's annual tourist travel in first round areas.

So the action may get together as something like the terms CAB has in the letter to Pan Am and TWA. By agreement by the foreign law system, CAB in its letter to Pan Am and TWA says that if it proves impossible to get a resolution on seating density, some time ago, it will be decided by the ruling of 1951 at the latest. That is a likely compromise to give agreement on unlimited number of trips.

for testing and simulated airline operations of transport helicopters, together with study of the helicopter's military operational experience, delivery of specific information to the Department of Defense, CAB, and National Aeronautics Administration.

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The report says that midsize or close-in helicopters are essential for air coach helicopter operations, and this is a good place to do so. This is a good place to do so.

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SPECIAL TREATMENT FOR B-36 STABILIZER

The extra long truck body was specially built for the job of transporting Convair B-36 bomber stabilizers from the Dallas plant of Tru-Lite, Convair subcontractor, to the assembly line at Ft. Worth. The

extra-long vehicle measures over 90 ft long bumper to bumper. Load truck-length limit is 75 ft, so in special permission has to be obtained. Truck set back truck is 37 ft, by law over 37 ft.

Military Jets to Vie In National Air Races

An attempt to crack the world speed record for a closed course will be made by a North American F86E Sabre jet over a 100-kilometer course in the climax of the two-day National Air Races at Detroit Aug. 19. Guest Referee now holds the record.

Ability of the Sabre to race tightly on the closed course at Detroit's Wayne County Airport will probably decide whether the USAF pilot flying the plane can better the 664.17 mph record which John Dancy, flying a de Havilland 106 jet plane set Aug. 12, 1948. An earlier F86A Sabre piloted by Maj. R. L. Johnson, at Edwards AFB, Calif. set the world's straightaway speed record, Sept. 15, 1948, at 670.16 mph, a record which still stands.

The closed-course race trial will carry the opportunity of Thompson Products, Inc., Cleveland, to present one of the Thompson Trophy Race traditions of previous National Air Races.

Major Races—Military jet competitions will highlight the two days of military and civilian racing, but a series of aircraft plane races for the Thompson Trophy will bring a scramble of 25 race pilots into competition for the \$25,000 prize money, for planes with 190 cc. in native displacement (approximately 90 hp).

Special flight shows by the Navy Saturday and the Air Force Sunday, will precede the racing schedules.

Flown for the continental tour will start Friday afternoon, when first races will be run Saturday afternoon and the final Sunday.

Four Bessie Trights—A Bessie Tright 2,000 cc. engine-driven, built from Edwards AFB, Calif., to Detroit Saturday will include on competing planes, three North American F-86E four jet Toronto Societies and three Republic F84E two-jet fighter bombers. The planes will represent the Air Proving Ground Strategic Air Command and Tactical Air Command.

From other Republic F84E's will compete in an Allison speed trials from Detroit to Chicago and return, two from SAC and two from TAC.

Aerobically North American F86E speed trials will be a short-range Chicago to Detroit race, with four planes participating.

Other Air Force flights demonstrate will include the first public aerial refueling demonstration involving two F-100s, newly adopted for in-flight refueling the North American F100C (see picture on p. 17) and the Republic F84C (pictured in Aviation Week June 26 p. 15). Refueling will be accomplished by Boeing tankers using the flying-boom refueling system.

Safety Record

Last year set a 15-year record for passenger safety in U.S. scheduled airlines.

The 1950 passenger fatality rate was 3.1 per 100 million domestic passenger miles. A new season of comparative safety statistics in domestic scheduled airline operations, stated by Civil Aeronautics Board, shows the following rates for previous years:

1935	4.7	3944	2.2
1939	1.2	3945	2.2
1940	1.0	3916	1.2
1941	2.1	3947	2.2
1942	3.7	3948	1.9
1945	1.3	3949	1.5

Navy flight show will be flown by Naval Reserve pilots. Only competitive event will be a record climb competition between a Chance Vultee F4U Corsair plane and a McDonnell F2H Banshee, tender to that held in the 1949 Cleveland Air Races. There will be race of the Navy aerobically which have induced previous years. Navy officials announced last week.

Large static displays of almost USAP and Navy plane types shown up at the report will be an extra crowd attraction. Navy will exhibit some 14 different types of planes and helicopters plus six patrol aircraft types. USAP will have approximately 25 plane types and some models.

Several of the Detroit race is being closely watched in the overall safety and by federal aviation agencies. Safety precautions taken following the tragic crash in the 1949 Thompson Trophy Race at Cleveland will be up for review. Any additional series are certain that you can well come a treat to the National Air Races.

Convair Flying Boat May Have Big Role

New emphasis on the Navy's four-engine Convair turboprop flying boat in turbocharging passengers passengers for 1952 and 1953 points to the probability of a reappraisal of the long range craft as a likely flying weapon and possible oceanic beach carrier.

First action of civilian government of the navy, streamlined airplane comes from Navy testimony in Congress indicating a firm conclusion, under the 12 of the turboprop planes is scheduled in 1952 funds. This is in addition to the two experimental XP5Y-1 planes which the manufacturer is now completing at San Diego.

Navy testimony did not name the plane under discussion at the House XP5Y-1 or XPY-100. Navy now claims that either was the type discussed, but testimony as to cost and size made it virtually certain that this was the air craft being described.

Match for B-36?—Some aviation Navy advocates say the turboprop flying boat, besides having the flexibility of water-based operations will do anything the Air Force's big B-36 intercontinental bomber will, and faster.

While costs of the first two airplanes have not been disclosed, Navy testimony in Congress shows that the last 12 production planes will cost \$6,967,000 each at a total of \$83.6 million. Questioned by Congress, Rear Adm. T. S. Goode, Chief of the Navy Bureau of Aeronautics and that the per plane cost would drop "if we put in an additional order," probably to less than \$2 million each, perhaps as low as \$1.5 million.

Price differential between the first production order and subsequent rapid procurement is attributed to production engineering and tooling involved in the price tag of the first two planes. "The next order of this same type aircraft which we plan for the 1952 budget will show a very modest drop," another official witness declared, "because these preliminary costs will almost have been absorbed in the program."

Anticipated Change—The Convair flying boat was originally designated XP5Y-1 and then redesignated XPY-1 when Navy decided last year to ask the producers of the plane as a transport type rather than as a previously planned role of long-range patrol bomber. One report is that the assignment was made to demolish any air service backing it as it would be needed "only and somewhat of 1949 and Navy until the big plane was in production."

The flying boat is powered by four Allison T-40 turboprop engines, now fully rated at 3,500 shaft horsepower, each driving 15 ft. six-bladed propellers with propellers. Latest estimates are that a more advanced version of the T-40 develops approximately 7,000 hp. Aircraft would immediately step up performance of the present aircraft. Wing span is 140 ft. and length is 130 ft. Range is approximately 5,000 mi. and maximum speed is rated at 780 mph with the original engines. The plane carries a crew of 12.

Another indication of the greater emphasis on big flying boats in future planning is the development of the new amphibious and self-propelled landing gear, to simplify handling of such craft, expressed by the Navy to EAC Corp. (Aviation Week Aug. 6 p. 12).

WHY SODIUM COOLED VALVES LAST LONGER

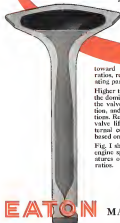
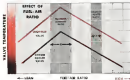
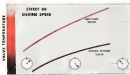


FIG. 1

FIG. 2



The trend in modern engine operation is toward higher speeds and more economical fuel-air ratios, resulting in higher temperatures for many operating parts.

Higher temperatures of exhaust valves, for instance, are the dominant factor limiting valve life, sharply reducing the valve material's resistance to corrosion and distortion, and definitely limiting its life under fatigue conditions. Reducing valve temperatures, therefore, lengthens valve life amazingly; this is best accomplished by internal cooling as shown in the accompanying graphs based on recorded test data.

Fig. 1 shows effect of internal cooling of valve over the engine speed range. Fig. 2 shows lower valve temperatures of the sodium cooled valve for various air-fuel ratios.

Engine engineers will be glad to work with you in applying the benefits of sodium cooled valves to your engines.

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Radiograph of Locomotive Cylinder Liner

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PRODUCTION ENGINEERING



NEW LATHE with right-angle chuck and T-bed has 46-in. swing and sensitivity for light cuts on large thin-wall rings. Operator can get close for measurements.



THREE-HEAD drilling machine drills, reams, countersinks with one setup. Hole pattern changes in a rapid drill shift easily spotted, expensive jigs eliminated.

Tool Flexibility Raises Jet Engine Output

P&W meets medium production rate needs with new machines.

Production engineering refinements at Pratt & Whitney Aircraft have introduced several new types of machines for more flexibility in the fabrication of turbine jet engines.

These tools, generally, are tailored for a certain production rate in correlation with an engine design stage that accommodates progressive changes up until the design is frozen.

Flexibility of the machines is such that they will be useful for special jobs and in development of new engine models even when single-purpose tools are needed by a higher level of production.

Four of the new types were developed quickly through collaboration of P&W's production engineers with machinery builders. Another is a modification of two existing machines for better adaptation to P&W's manufacturing scheme.

► **T-Bed Lathe**—P&W engineers didn't want to use the high horsepower, 10-in.-swing, heavy-duty lathe for machining ductile stainless steel and cast iron in engine case assemblies, blade shrouds and tailpipes. These rings, running as high as 95 in. in diameter, are



COMBINATION lathe and internal grinder allows second operation, such as reaming and chamfering after grinding job for swing in setup time and better accuracy.

relatively light and precise cuts, and for this work, the tooling was geared the capacity of a large car wheel lathe with the sensitivity of a toolroom unit.

Consultation with Lodge & Shipley resulted in a special, right-angle, chucking lathe with a T-shaped bed, with the section mounting the carriage at 90 deg to the lathe cast-iron. The carriage is fitted with a cross-slide which can move parallel or at right angles to the cast-iron so that the machine can handle facing, straight or taper turning, or boring.

The tool uses a 25-in. heavy-duty headstock with 11½-in. hole for chucking grooves with a slide or other extension. Bulk of the parts to be made are fastened to the 5-in. diameter aluminum flangeplate with clamps and rods,

HARTWELL FITTINGS



AN 737



AN 740



AN 738



AN 741



AN 739



AN 736



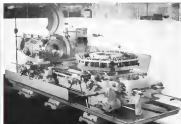
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TURKEY SAW—enabling extra rigidity for new machining of tough alloys for disk transmits large toolholding capacity of early Heiden design

in by chuck pins which are bolted to this plate.
Low moment of inertia of the plate gives easy stopping and starting. Servo-actuator permits tolerances up to .001 in. There are 25 spindle speeds (1 to 125 rpm) and 53 feed speeds (.001 to .0054 in./rev).

Loading and unloading are easier than on standard lathes, P&WA says, because of the absence of the long bed extending beyond the workpiece. And the operator can stand much closer to the work to watch cutting and make measurements.

Another benefit is the saving in floor space—only half that occupied by a standard 60-in.-long lathe. And cost is several thousand dollars less than that of comparable 60-in. lathes on the market, the company reports.

The unit is well suited as a second-operation machine to remove rough-cut work from a variety of alloy steel and several of the units teamed with the latter make an "ideal" production line, says P&WA.

Five of the new machines already are installed and Lodge & Shipley is supplying them to other industries, as well.

► **Three-Head Drills**—There is a large variety of drilling patterns in the company's fabrication of anti-flow jets, spread over diameters up to 48 in. and at some instances involving as many as 735 holes.

Multi-spindle drilling machines weren't considered practical for the work, because the volume of production did not justify the outlay for such specialized machines, capable of handling the entire range of patterns.

Low in drill changing time was another factor. Also, because standard



VERTICAL BRIDGE has individual tool sections (upper arrow), forms both sides of hole (not lower arrow) at once. Balloos a dipper back for hole removal.

and other gas turbine materials tend to stick fixtures at a alarming rate when the tool doesn't cut freely, P&WA says that with a multi-spindle machine it would be very easy to run a set of drills and several components before a drill drill was discarded by the operator.

And the company reports that there was no standard drilling machine available sufficiently flexible to handle the variety of holes required. Cost of making drill jigs for numerous large maps would have been a major expense.

New Britain Machine Co. went to work on P&WA's suggestions and came up with a three-head, adjustable spindle,

for electrical connections through pressurized bulkheads



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individually
from either side
of the
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pressurized
panel



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(long, solid bonding tool) imposed heat on the operation. Teeth could not be achieved to adjust the amount of cut and the multiple-tooth action could not be made as kind as individual teeth can be made.

Now, both sides of the blade root are formed at one pass on a Laporte 15-ton, 90-ton vertical broach, using individual teeth (hollow center) instead of the long multi-tooth arrangement. This set-up departs from the old idea that several teeth should be on the cut at one time, which, P&WA tool engineers say, is obsolete, because today's machines are so constructed that the run guides give fine control over stroke alignment, and the teeth can be used for their primary function—cutting. And greater chip clearance is provided, because teeth are more widely spaced than in the old method.

Furthermore, it has required high skill to produce multi-tooth broach action, whereas now the desired accuracy is obtained through controlling the face of the grinding wheel which forms the teeth, so that the operation can be performed by a workman of average ability.

Because of blade material characteristics, the roots are knurled .005 in. diameter. Resonance shock is removed with a surface grinder, whose wheel is dressed with a diamond dresser, at a 160 rpm, or on a two-wheel Kaelin or J&L grinder designed for the operation.

The combination of broaching and grinding gives the finish accuracy required and is less expensive than the old method of milling.

A distinct advantage of the individual tooth action is that it can be used up completely, for an appreciable amount in the manufacture of high-speed cutting tools.

And P&WA is now studying the application of carbide tips on the broach teeth.

► **Leaf-Gearbox Combination**—The engine's large number of thin wall rings and weldments call for close control of size and surface finish—best achieved on a grinding machine. But subsequent operations on these parts, such as re-grinding and chamfering, ordinarily will require another machine—engine lathe or boring mill.

This prompted P&WA's tooling team to devise a scheme for performing a lathe operation while the ring was still mounted in the grinder. They took the turning slide of a Meehan engine lathe and mounted it onto the bed of a Hould 174 internal grinder, so that re-grinding or chamfering could be done without removing the part from the chuck. This ingenious arrangement saves time and gives greater accuracy by insuring concentricity of cuts.

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reliably over a little capable of swinging a 45-ton ring.

► **Turret Latch**—Flexibility—P&WA engineers wanted flexible tooling to cope with the problem of fabricating under a semi-production status a large number of one-piece and turbine disk still subject to design changes.

The turret latch's flexibility combined with ease or less "permanence" tooling offered an answer if sufficient rigidity could be incorporated for easy switching of heat-treating slots with turbine tools.

A post-World War I German latch with heavy, flat sliding turret carried an abundance of tool-holding sockets. This basic arrangement was adopted by P&WA tooling men and today at Lancaster part these fixtures fit three into a heavy-duty unit of modern design—the 10 lb cross-sliding turret latch.

Extra support for the cutting tool is a hardened steel plate which spans the gap in the cavity, absorbing against the face of a small lever-type tool post. On this plate ride the toolhead and both projecting faces the lower part of the tool holder. This gives maximum rigidity to the cutting tool, because in effect there is no turret swiveling.

A large number of tool-holding sockets are provided. These are in place that in wide range of tools can be mounted. The toolpost tools are maintained in the holder by templates corresponding to the contour of the disk to be cut.

By using an instrument of tool plates, P&WA tooling men estimate that they can machine 100,000 of disks in both order. Not all tools fit this range can be set up at once, but at one time all tools needed for machining both sides of two runs of disks can be loaded.

Several tools can be used to remove metal simultaneously in place of cutting the rings.

Contract Awarded For Navy Missiles

Hyman Manufacturing Co. and DeLaud & Ludwig, Pasadena, Calif., have won a joint multi-million dollar Navy contract for an air-to-air rocket type missile developed by engineers and scientists at the Naval Ordnance Test Station at Pasadena.

Both firms made earlier contracts in World War II.

Production under the new contract will be carried out at existing plants and shops at the two companies as well as in expanded facilities now being set up. Deliveries are to start in three months.

The missile is designed to small enough to be carried in quantity by high-speed jet-powered fighters to destroy any known aircraft with one direct hit.

Ingenuity Marks French Patents

SNCASO will license 11 aircraft design features it has developed.

The design ingenuity of SNCASO is emphasized by descriptions and sketches of some of their patents recently made available for licensing agreements by the French firm.

Patents are in the field of aerodynamics, rotary wing, soft, conformations, slitting gear and jet turbines.

► **Boundary-Layer Control**—One system on development is in the field of boundary-layer control. The SNCASO reverses conditions suction and blowing, the latter scheme enhancing oxygen.

The general arrangement can be seen from the drawing. The wing has a double leading edge flap and nose flap. Air is blown from a gas turbine and fed out through the wings in a small duct. The primary driving gas for the engine is fed from this duct. They discharge into the ejector tube, which has a mixing chamber and a discharge nozzle which directs the blast of air over the upper surface of the second flap.

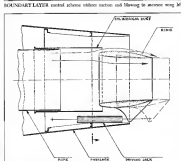
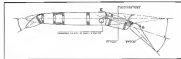
The only disturbing feature is that the secondary air in the ejector is taken from what is referred to as a suction chamber, where carbon dust, coming either from the slit between the wing and the first flap or from the leading edge slot. It would seem that suction processes at the entrance to an ejector are not exactly desirable. Presumably this could be solved by venting the secondary air source to the lower surface of the wing.

► **Inject Caplets**—Another patent deals with leading fuel to the rotating engine on a helicopter. SNCASO points out that the poppet valve efficiency of a target on a rotor turns is usually with such an engine. Consequently, the more the high efficiency, the longer fuel feed must also be varied cyclically.

The poppet valve of target thrust also creates a resultant poppet force which helps the translational motion of the rotor.

Two devices are covered by the patents. One is purely mechanical and uses rams in actuator fuel valves, the other is electro-mechanical and uses a collector and electrically operated valves.

SNCASO holds a process to provide a directional control system for jet-driven rotors. In such systems, there is no engine torque to be compensated for in flight and a jet rotor can be needed. But some torque must be generated to



NOZZLE AREA of jet engine is used by nozzle control of axial connection

make directional control at low speeds possible, and aerodynamic reduce air rotor efficiency.

So a transmission system is needed between the rotor and the engine (which drives the propeller or jet turbine) or the rotor in a helicopter arrangement, the transmission has infinitely variable action and a slip device (flexion limit). This transmits mechanical power from the engine to the rotor shaft, producing a torque which rotates the fuel eye to the desired position.

► **Nozzle Variations**—One of the problems of jet-driven rotors is the development of a device for varying the exit area of the engine turbine. SNCASO tackled the problem and came up with a ring of axial action in an axial plane, mounted at the rear of the pipe. By changing the position of the ring, the exit area can be varied. Maximum effective action is about twice

the maximum, which appears to be an adequate range of ratios.

The varying area of logic which or by using leading gear in the fuselage of planes (see E-10, for example), or the French SO M-2, has prompted the design of wing leading gear. One of these, developed by SNCASO, is automatically detachable. The rear part of the gear is carried on the leading edge by two hemispherical convex bags attached to the wing by ball joints.

When takeoff begins, the wheels are kept on the ground by spring rods located in the street. As the takeoff speed (which weight of plane is gradually lifted during takeoff) and a mechanical linkage is actuated to turn and release the ball joint. The rotating gear then detaches itself and lifts away.

► **Reversible**—A variable gear has been devised which can be actuated into the wing. In this gear, the wheel is

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Shows stress in high temperature alloy after exposures to a corrosive gas stream for 232 hours. Temperature was in excess of 2000°F. and there was actual flame impingement on the metal itself. The effects of intergranular corrosion and scale loss under such conditions are obvious.

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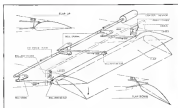
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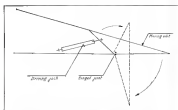
All Consolidated Value B-56 aircraft exhaust burners are equipped with "ceramic coated" South Wind heat exchangers. After careful inspection the process was found to increase the life of these units by as much as 100%.



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FLAP LINKAGE for the wing into master driving rod bell cranks and drive rods.



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connected on two pins. One provides the folding motion. The second is a vertical extension pick, which sets independently of the first.

In use, the extension pick leaves the wheel fully for low speed ground handling. The wheel is raised fully (but not actuated) for landing, in this case, the main wheels take the impact load, and the wing wheels act much like spring shock, coping only on only when the aircraft rolls slightly in one direction.

Investigation by SNCASO into the methods of wing flap attachment have produced a linkage in which the flap is driven from rods attached to bell cranks. The cranks are operated by a single traverse rod to which is fastened the actuating cylinder.

The chain is made that with this linkage the entire wing—hinges, doors, actuators—can be located within the contour of air as a thin wing. SNCASO further claims that the flap movement can be separated to a resolution about a theoretical axis located

at any designed distance beneath the wing. And, it is pointed out, the system does not require much adjustment, misalignment, or a second because variations of several millimeters are permissible.

► **Brakes**—A simple air brake has been developed which increases the aircraft drag without shifting the lift. Furthermore, the brake can produce either no change in pitching moment, or a change in a selected direction, as desired.

Several SNCASO craft use the brake which can be fitted either on the wing trailing edge, or on the wing flap if necessary.

For interior finishing of new two-part, the SQ-30, the Socat-Chant system developed a method of fabric in thin sheet finishing. A channel section holds a end spring between the wall, allowing legs of the section. The open side width of the channel is less than the spring diameter. To use the system, sheet materials are wrapped around the spring and then the spring is



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An Important Message on CMP

It has come to our attention that some steel consumers, particularly those concerned with "B" products, have been requesting allotments from their steel suppliers or passing on to them their allotment authorizations. This is contrary to CMP regulations, and seriously delays the entire allotment procedure for you.

Therefore, in an effort to help clarify this situation, we have briefly indicated below the general procedure which should be followed in securing an allotment.

► We would like to emphasize that steel warehouse distributors are not involved with the handling or issuance of allotments. When placing an order with your steel supplier, simply show your allotment number and the quarter for which the allotment is valid (Example: K-3-4035). Orders must also be properly certified under CMP regulations.

The General Requirements For Obtaining An Allotment

CLASS "A" PRODUCERS

1. If you are a producer of a class "A" product you will get your allotments for controlled materials from the district agency (intermediate) prime customer (seller to domestic agency) or secondary customer (seller to prime customer) to whom you sell your product. IN EACH CASE, GO DIRECTLY TO YOUR OWN CUSTOMER FOR AN ALLOTMENT.

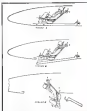
2. Your allotment application (Form CMP-A4) must indicate the amounts of controlled materials needed by your sub-contractors as well as by you.

3. You must not apply for controlled materials used for class "B" products to be incorporated in your class "A" product; class producers of class "B" products will receive their allotments direct from the NPA.

CLASS "B" PRODUCERS

1. If you are a producer of a class "B" product your application for controlled materials is from ECLIPSE sent to the proper federal division of NPA. You cannot obtain an allotment from any other source.

2. Your application (Form CMP-A4) must show all the controlled materials you need as well as controlled materials needed by your sub-contractors producing class "A" products to be incorporated in your class "B" product.



EJECTION SEAT design pilot does not exit.

forced into the ejection seat.

The claim is that the system makes possible ejection without danger, that the fabric can be reconnected for better fit, and that the fabric cutting for installation need not be in person in before the system was used.

► Ejection Seat—The problem of flight ejection from a high-speed plane has long been an interesting problem. The patent covers a scheme for the downward ejection of the pilot.

The linkage is so arranged that when the pilot pulls the ejection handle, the seat and door below it fall away together. As the door continues, the door separates from the seat. Finally, the seat drops clear and the pilot is ejected head first.

The absence of vertical acceleration during the ejection is one of the chief advantages claimed by SNCASO engineers for this method.

Another design feature said on the SO-30 transport is the pressure-tight door. This door can be pulled to any angle of circular cross-section.

The door slides on vertical guides and retracts beneath the cabin floor. When closed, the door is fixed against the inside of the fuselage frame by a safety pin, which makes possible a lighter door than one which doors in the same inward manner against the outside of the fuselage frame.

SNCASO says that the door has never caused trouble. Only indication of load on the door is the figure of three tons at 10,000 ft.

SNCASO (Société Nationale de Constructions Aéronautiques du Sud-Ouest) is one of the authorized French aircraft factories. Further technical data on the invention and details of financial agreements may be obtained from M. le Chef du Service des Ventes de la SNCASO, 195 Avenue Raymond Poincaré, Paris, France.



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SOLAR'S CERAMIC coating a spruel in use of General Electric's combustion chamber liner, which will be used, because of its bonding to metal.



AMS 312 stainless steel samples tested at 1,850°F. Prior (left), with the Solar ceramic coating after 150 hr. Uncoated sample (right) after 20 hr.

Ceramic Liners

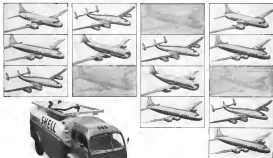
Common metals with new Solar coating can replace scarce alloys.

Solar Aircraft Co.'s efforts in high temperature ceramic research have paid dividends.

The company has developed a new coating process that will boost life expectancy of jet engine parts, and give an equivalent saving power to more common metals substituted for scarce alloy.

While the "Solaronic" process now is being applied chiefly to jet engine components, other military possibilities include rockets, guided missiles and all types of heat engines. Applications in civilian industries also appear promising. ▶ Vandalia, Ohio—The production

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—manufacturers of SKF and ISO-8081 bearings.

chamber is one present example of the present application. The chris heat has been produced from an alloy containing approximately 75% nickel, with a life of about 260 hr. With Solar's coating, a less-expensive stainless steel with 5% nickel content will stand up for the same time, the company says.

Here is a summary of some of the advantages Solar advances for its coating:

- Protection against oxidation and corrosion at high heat.
- Savings in critical materials and trouble-free use of "lessor" alloys in many high-temperature applications.
- Reduction of hot spots because of the material's heat-conductivity characteristics.
- Reduction of cracking and warpage.
- Specific surface treatment—smooth, rough, heat reflecting or heat-absorbing.
- Improved metal fatigue properties.
- Higher temperatures and life with coated parts than with uncoated material.
- Covers all types of welds.
- Good adherence in direction and to reverse signs of materials.
- Substitution of metal surfaces.
- Titanium combined with strength.

Solar says that its coating is much heavier than other ceramic coatings, that it can be heated or cooled rapidly without cracking or flaking, and in some applications expands and contracts with the metal.

Government agencies also have been engaged in extensive research in the field of ceramics. Solar reports, however, that it is the only company in this country working on a non-government-sponsored, high-temperature, ceramic research program, receiving no financial aid from government or other sources.

NACA Reports

► Analysis of Temperature Distribution in Liquid-Cooled Turbojet Engines (TN 1321)—by John N. B. Leung and W. Hynes Bawa.

This report presents a variety of analytical methods for computing temperature distributions in liquid-cooled turbine blades. The methods are first presented mathematically and then illustrated examples are used to compare simplified and more-complete solutions as well as to find the effects of several variables. Some of the temperature distribution calculations are complicated by the use of one-dimensional charts which are given.

One significant result is that for blade materials having low thermal conductivity (which would correspond to ceramics) and blade materials in operation using a one-dimensional, average temperature distribution is applicable

near a coolant passage. Irrespective of blade length, the cooled part of the blade situated at a surface temperature which is called the present blade temperature. This present blade temperature measured about 1500° for an average of 10000° is a difference between effective gas temperature and coolant temperature. This held true for a range of effective gas temperatures from 2000° to 3000°.

In cases where gas cooling is important, a one-dimensional distribution temperature distribution equation reduced for first-order approximation.

Complete one-dimensional average temperature distribution method is developed mathematically in an appendix, along with a three-dimensional and a one-dimensional distribution temperature distribution. Several numerical examples are included to show the method.

► Experimental investigation of local and average of Laminar-Boundary-Layer Separation (TN 1346)—by William J. Bertel and L. J. Lofth, Jr.

One of the general phenomena in boundary layer flow is referred to as the laminar separation bubble. This is

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chaired under certain circumstances as a localized region of separated flow behind the laminar separation. Downstream of the bubble, the boundary layer detaches itself to the surface.

Giametta has indicated that the extreme end use of these localized regions of separation depend in some way upon the Reynolds number. But no information is available which indicates that such a region will exist under a given set of conditions or what the extent of the region will be if it does exist.

In an effort to give detailed information on the formation and behavior of localized regions of laminar separation, the investigation reported on this note was made on an NACA 66 series airfoil section. Particular test conditions and flow angles were chosen because large localized regions of laminar separation were believed to exist.

One reason for the investigation was that it was believed that a knowledge of the parameters controlling the laminar bubble at its rear end left would prove of value in future investigations on laminar flow.

The length of laminar boundary layer between separation and transition was found to depend on the Reynolds number of the boundary layer at separation. Also transition occurred at the separated layer, turbulence spread at a relatively constant angle. The extent of the flow in the turbulent boundary layer was not substantially predictable by the semi-empirical correlation of the rate of growth and the change in slope.

► **Airfoil Parameters for Correlating Correlation.** Aerodynamic Characteristics of Swept Wings (TN 2135)—by Franklin W. Doolittle.

It has long been aerodynamic practice to use geometrical aspect ratio as a means for correlating and analyzing certain parameters of swept wings. For the case of swept wings, however, the significance of the aspect ratio is not obvious. In fact, neither geometric aspect ratio nor any other linear parameter (which can be tied in with the geometry of the wing) can serve to tend to correlate the aerodynamic of swept wings.

In this note the author expresses approximately the lift curve slope and the coefficient of drag as well as swept wings as a composite function. Both lift and drag are functions of the sweep angle and the aspect ratio. The author discusses the use of this parameter in predicting and correlating aerodynamic characteristics and also the limitations attendant upon such use.

—DAA

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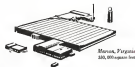
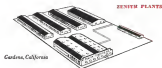
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AVIONICS

Miniature Relays Hermetically Sealed

Two new lines of miniature, hermetically sealed relays are being offered by Allied Control Co., Inc. and Verobase, Inc.

► **Allied Line**—Allied, at 2 East 32nd Ave., New York 21, says that its relays are tested for operation up to 70,000 ft. These relays, designated Type M11, are available in 2, 4 and 6-pole double throw, and meet the requirements of USAF Spec. M11, B. 157.

Sealed height for all three sizes is 15 in., and dimensions are 2-pole, 9 in., 1-pole, 1 1/2 in.; 6-pole, 13/16 in. Temperature range for the standard type M11 is -55°C to 85°C; for the high temperature type M11A it is -65°C to 200°C.

These relays will tolerate vibration of 20 G, and shock of 30 G of 10 milliseconds duration in any operating condition.

Normal coil voltage is 25.5 v dc. The manufacturers say that the coils will tolerate overvoltages of 237% for 8 hours without damage. Relays will operate at 15 v dc. in less after exposure to any of the stated conditions of volt-

age and ambient temperature, and will tolerate at 15 v dc. or less.

Minimum power requirement at most low pressure is less than one watt. Life expectancy is over 1 million operations.

► **Necometric Office**—A similar line of relays has been announced by Necometric, 11613 San Vicente Blvd., Los Angeles 46, Calif.

These relays were developed to meet space and performance requirements of military aircraft and guided missiles, radar, radio and measuring devices. They weigh a little less than one ounce, and occupy about 65 cc. in. Standard seven pin miniature plug-in base is used, if extra activity is needed in harness. Ranges are available. On a solder lug seal can be substituted for the plug-in base when desired.

The relay line designated the Series 5000 by the manufacturers—has been designed to take 280 vibration and more than 50G acceleration in any direction without affecting contact position.

One specific Necometric model type, Model 5012 is an SPDT type with coils available in ratings from 3 to 75 v dc., and resistances from 5 to 500 ohms. Other pole arrangements are available.



PORTABLE RADAR TOWER

Shown here in advanced assembly stage at Goddard Space Center's testing track, is the tower being built under subcontract from General Electric Co. and for ultimate use by USAF. Presumably a type of early-

warning radar, the structure and tower are designed for compact launchers with small units for compatibility. All sections made required for ultimate assembly are shipped with the launchers and.



Boeing B-57D fighter jet of 1953 vintage. But conventional and planes, as described by B. J. de Boer, a new Boeing B-57D fighter jet.

Out of the past comes the future

Boeing celebrates its 35th anniversary this year. Not old by ordinary standards, but in aviation, it's a whole age—usually the age of flight.

During these 35 years, Boeing engineers and production men have seen—and played an important part in—the transition from stick and wire flying machines to today's comfortable

speedy, commercial transports. They have contributed to the nation's defense with a variety of military aircraft—from jet fighters of the 20's to the B-17 Flying Fortress and B-29 Superfortress of World War II.

Today the company will pioneer—with planes like the huge Strato-fighter and Supersonic, the B-50

Supersonic, the 600-mile-an-hour B-47 Stratojet (the soon-to-appear B-52 eight jet bomber and highly secret guided missile projects).

Boeing regards the experience gained during its first 35 years as a steppingstone toward continued progress—a solid foundation for meeting the challenges that lie ahead.

For the Air Force, Boeing built the B-47 Stratojet, B-48 Supersonic and G-37 Stratojet; and for the world's leading airlines, Boeing has built the B-707 and the new B-747 Stratocruiser.

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in an alloy stage. The alloy may be silvered sealed with inert gases.

New alloys to be soon available include double-pole types, ultra-sensitive and high-temperature units.

Additional information can be obtained from Mr. Ross Wick at the manufacturer's address.

Low-Power Device Replaces Tubes

Computer Research Corp., Torrance, Calif. has announced the development of a vacuum tube replacement for certain medium-speed counting, amplifying and control applications. The device, known as the CRC Five-Keweenaw Flip-Flap, has no filament to burn out. It operates about 0.1 the volume of a comparable vacuum tube. It is immune to sectioning and shock and will operate for years without servicing.

It operates on about 10% of the power needed by an equivalent vacuum tube, and delivers 90% of the input energy as useful output. There is virtually no problem of heat dissipation in the device.

The Flip-Flap is being produced in metal base plug-in form, although it can be manufactured or provided with solder leads.

According to the manufacturer, the unit for the unit provides ring, grid or carry-type counting, highly accurate, magnetic-amplifying switching, storing, delaying, pulse-shaping, or vacuum-tube in computer, telecounting, noise, radar and other fields.

Small Rectifiers

International Rectifier Corp. announces a new line of hermetically sealed modules.

The modules are assembled in half-wave cathodes with current ratings from 100 microamperes up to 60 milliamperes. Individual cathodes were made up to 400 milliamperes with dc voltage ratings up to 5,000 v. per cathode. In constructing a number of cathodes in series voltages up to 150,000 v. can be obtained.

The assembly is rugged, easy to re-charge, and improves in the effects of outside atmosphere. The units are withstand 10,000 vibrations. They can be operated in ambient temperatures up to 212°F.

Outside diameters vary from 3/16 in. up to 1 1/4 in. depending upon current rating. These rectifiers are designed for such applications as vacuum radar components and control systems.

Write the company for bulletins and other literature. International Rectifier Corp., 6809 S. Victoria Ave., Los Angeles 43.

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T-35 TEMCO Buckaroo



FIREPOWER WITH HIGH MANEUVERABILITY



With a mounting of two 30 Cal. machine guns and two 2.75 inch rockets, and provision for light armor plate, the T-35 TEMCO Buckaroo has become a highly maneuverable ground support weapon with all the flight control characteristics of the big fighters.

Machine gun installations at the rearward center of the wing in a completely submerged mounting provides more efficient cooling and better protection from the elements. Purolator Corporation has been designated to the General Forces and team showed an exceptionally accurate dispersal pattern. A 30-mm gun camera can be operated independently of aerial firing, thus extending its use to observation and reconnaissance.

The Buckaroo offers a wide range of versatility and fits the need for a light general support plane capable of making slow runs on targets. Outstanding, accurate, easy maneuvers are wing slots which give full lateral control up to and completely through the stalled attitude.

Designed and developed by a Military Plane Manufacturer, the TEMCO Buckaroo meets the Army requirements for a small maneuverable aircraft at the lowest possible cost, both in original price and maintenance.



Technical Engineering and Manufacturing Co., Inc.
DALLAS, TEXAS

Ten intervention-controlled 2.75-inch rockets are carried beneath the wings of the T-35.

EQUIPMENT

Plug Fouling Remedies Discussed

European Ignition Conference studies TCP compound and other means of eliminating spark plug failures.

By Nathaniel Mikitenek
(McGraw-Hill World News)

London—More than 100 representatives of airlines, engine manufacturers, equipment makers, and government departments met in London's Hotel Savoy recently for the second annual European Ignition Conference.

The conference, now accepted as an annual feature by the European aviation world, was sponsored by Ludwig Flug Ltd., Berlin. As he did last year, Air Commissioner F. R. Benda, Associated British Co. Ltd., held the chair for the two-day session.

The spark plug was the star of the show as the conference discussed lead fouling, graphite analysis, plug design, plug servicing, carbon and lacquer, low tension vs. high tension, and jet ignition systems—problems that bother service the world over.

►Lead Fouling—The big news of the conference was identical at the last session in the U. S. government changed the accuracy had on a paper scheduled to be delivered by F. L. Ross of Shell Petroleum's Thornton Aero Engine Lab on a new ball algorithm designed to help the lead fouling problem.

Benda did explain that Shell and Benth-Rover were now testing two ball algorithms and had high hopes that this was the long sought-for answer to lead fouling. Tests are also going on at the U. S.

Discussion brought out that TCP plus a high boiling point scavenger (probably with low volatility) were being added to normal engine oils. Tolerances was that TCP plus a scavenge for made up 30% of the scavenger.

Tests at Thornton have been run on a newly evolved engine for 18 hours with results showing "considerably less fouling with TCP than without it." Further bench tests on a Coflex for 40 hr showed no plug trouble with TCP, less plug failure in 30 hr with out it. A flight test in a Coflex showed only slight trouble up to 125-150 hours. And at that time the gap erosion was considerably below normal.

Reds-Rover is currently testing TCP under international testing conditions. TCP, B.R. pointed out, does not attack metallic lead, only lead salt. The company warned that "a metallic de-

posit might reach the point where it became incandescent and caused pre-ignition."

Prof. J. Whitney Austin told of his experience with the use of a probe as a scavenger. Broadest results had been obtained by running the R-4100 at 3000 rpm, 4000 psi, and injecting probe for two minutes. P.W.A. admitted no official tests had been made, adding that agencies were strictly one shot—it didn't work the first time, there was no one trying it on the same engine again.

Trans Canada Airlines (which throughout the conference quoted Pan American, W.A. by agreement) discussed. PanAm had been able to use an ignition analysis to see leading faces and had found proper in some cases in good effect. PanAm still had no comment.

►Ignition Analysis—The conference showed much enthusiasm for ignition analysis, but the consensus was the device couldn't yet be used as to determine plug life, though some engines hoped the time spent for off-consumption of the discussion was that two weeks was enough training time for operation. The job of the analyzer was to answer: Where is the trouble and what is it? Not "Is it bad?"

TCA thinks analysis will cut their scheduled plug removal 60%. Last year out of 10,000 aircraft, only 500 were unserviceable. TCA quoted Pan Am in saying engines had used about 53,000 lb per gross weight per year. TCA's target is to save about \$70,000 overall. Cost of TCA's Benda equipment and British-Thompson-Houston analyzer is only \$10,000.

PanAm, running with TCA, created new plug advantages of analysis. PanAm was now the device to trouble shoot its testing system, give probable torque loss, and "discuss the results."

►Other Research—REA, which was an experimental project, the British-Thompson-Houston analyzer, complained about a credit. The V6 engine has a 1918 B. lightning hit as a source. BOAC wanted to know if the engine had failed too soon to be in the field. BOAC wanted to know if the engine had failed too soon to be in the field. BOAC wanted to know if the engine had failed too soon to be in the field.

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115 YEARS

Pinavia's despite analysis, so it is showing lack of interest.

RAF has one flying unit on service trial. The Royal Navy has a unit in service on the wheel trials of a Sea Fury. BCAF is fully equipped.

SAS ordered a unit for trial a year ago and it is still waiting for it.

R.R. said if an analysis could detect a control mistake as well as a short, had occurred in the distributor, at the elbow, or in the plug, Bendix admitted the device couldn't tell such things.

► Plug Design—Bendix told of a new plug, now testing at P&WA. Pinpoint is to bring the cylinder close to the sparking surface. Plug designed for U. S. engines, it can be either mass or electrode or fine wire. In the latter case, Lodge says, considerable problems can be solved.

The discussion brought out that, in the U. S., mass electrode plugs were getting more and more popularity at the expense of fine wire.

BOAC made the statement: "Ignition is a very minor point in spark plug life in our operations—except on the Merlin." TCA, BSA, SAS all agreed. Most have mass and some an electrode plug, mostly at 350 ft.

Here are further observations on plugs:

► R.R. still favored fine wire plugs because, "We have proved, they have a higher performance rating."

► KLM found that erosion in fine wire plugs was low at first but increased progressively. Erosion in massive electrodes started high and leveled off about 500 hours, became negligible after 500 hours.

► TCA confirmed KLM's statement saying that it had held off massive electrodes because of the current's cold weather problem. Later tests at an R-100 showed that in cold weather there was no difference between the two types, so TCA now massive electrodes exclusively in its turbo-prop engines.

► Engineers agreed that they couldn't add a plug manufacturer to make a fine wire or massive electrode plug to fit all engines.

► Lodge commented that they had no covered tests to substitute materials for platinum in the mass plug but "found the evidence still supported platinum over the rest."

► SAS and others believed that nose erosion was about the number one plug design headache.

► Cheung Agnew-Ross Aircraft Co. technician described its newest design, apart which based on to be a very close duplicate of DeSoutter's present de-



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sembled at the Chapman conference last fall.

RAF's formula is based on some serious testing, based on a test rig using drums, with three 12-1/2-in. plug holes in it. Devcon observed non-eroding deposits in an hour, though longer exposure won't hurt the plugs. SAS, entering in still skeptical, but RAF hopes the process will eventually make this step unnecessary. The compound will not yet attack metallic lead or copper, however.

► Ignition Cable-British system cables were severely condemned. W. F. Herley, Telegraph Works Co., Ltd., making the base of the system. R.R. claimed that Preforma's 2658 cable was still the best, and accordingly, not responsible in terms for British engines.

New cable materials were thoroughly discussed.

RAF doubted that Preforma's 2658 was the answer for high temperatures. It didn't show anything might do up to 190C. Teflon was better but had expense. Silicone rubber had a big drawback in that it was attacked by petrol and gasoline.

Herley thought the mechanical properties of silicone rubber were just poor ("Combined, couldn't be used in most cases"). The firm added that nylon fibers didn't have enough moisture resistance. Company was experimenting with a cellulose lacquer to avoid leakage. Cable will consist of stainless steel conductors, rubber insulation, cotton sheathing, and cellulose layers. Herley has now installed U. S. cable welding machines and is making a small production of U. S. type.

Teflon came in the same criticism from TCA "because its chemical analysis may show trouble," and from RAF "because of poor voltage characteristics (breakdown of 1000-1) and because of their higher voltage and temperature."

► Magneto-Magneto discussion continued around two points trouble with magneto wiring and missing problems.

Several lines had had trouble with permanent magnets to stimulate magnets. AD was carrying the permanent magnets.

TCA reported trouble in 2800s and 1900s. The airline reported that Preforma had done very well with the permanent magnets and was trying to make improvements with a few lead in the process.

BOAC and they hadn't had much pump trouble, but weight considerations led them to follow Preforma's lead.

KLM reported that, particularly on their Conquest, was coming a lot of trouble, particularly in the bearings. SAS has switched to contact bleed after bearing trouble and oil leakage experience with permanent magnets, where equipment was made.

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Electroluminescence: New Word in Lighting

A completely new method of lighting, as revolutionary as the fluorescent tube and with many potential non-traditional applications, such as illumination of instrument dials, emergency exits and the cabin has been announced by Sylvania Electric Products, Inc.

The new lamp, called "Pracible," is nothing more than a piece of window glass so treated that it emits an appreciable amount of light when properly connected to ordinary 110 v., 60 cycle house current. Efficiency, upon which the consumption of energy to light depends in this case is termed electroluminescence.

• **Light Weight**—The "lamp" weighs hardly any more than an equivalent thickness of untreated glass. Vast thicknesses of material casting incandescence is about 1/100 in. thickness, indicating that the process may be applied to plastics as well as glass, thus further reducing weight.

• **Economy**—Current consumption of Pracible the size of an automobile taillight is about 1/25 of a watt. A 4 x 6 ft. panel consumes less energy than a 25 watt bulb. Light output at these consumptions is approximately 0.1 foot-candle.

• **Longevity**—Since there are no filaments to burn out, life of the lamps



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ENGINEERS' NOTEBOOK

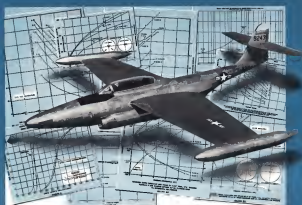


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should be indefinite, according to the maker. Previously, indicators are that a life span of 2-3 years may be expected from the tubes.

• **Coolness**—For most applications, Philips, in the context of all light sources, Schukin says, since it does not require outside air, because concentration of temperature of operation is unattainable in the human hand. As brightness is increased with heated current, slight temperature rise may be expected.

• **Versatility**—The applications of Philips are as limitless as the uses of glass or plastic. The only additional accessories being brought in to bring in a power supply.

• **What Makes It Glow**—The lamp is essentially a luminous condenser consisting of a special sheet of conductive glass (or plastic) on which is placed a "phosphor electrode" emitting and a sign of vaporous aluminum. As the "condenser" charges and discharges, current the electrons flow through the electrode and excite the phosphor material suspended in it. The result is light which assumes full brilliance the instant current is applied.

Schukin believes that the simplicity of the lamp is a feature attractive to the aviation industry. Moreover, since the light output is a function of voltage and frequency, actually having 400-cycle current available would achieve relatively high light output from Philips. Brightness of the light may be easily controlled with a rheostat and light intensity may be increased by incorporating a simple transformer in the feed-in circuit.

Only color currently available commercially is a brilliant green. Other colors seem to be made available as white, yellow and light blue.

Electricity, as a light source, started with incandescent lamps, known as point sources. They were not discharge lamps, as complicated by the filament tube, dubbed tube sources, although, of course, they may be moved or cooled into many geometric shapes. Now, for the first time, says Schukin, there is available an *area or plane source* of light as electroluminescent Philips.

Magnesium Wheel

A new indicator wheel, capable of carrying 60,000 lb, has just been developed for the USAF's speedy B-47 jet bomber.

Perfected by the B. F. Goodrich Co., the 56 x 16 in. wheel incorporates a new design and has supported a 325,000 lb load in tests, giving it a 5-1 safety factor according to the manufacturer. The wheels mount firm carrying 240 lb pressure that are also capable of carrying a 60,000 lb load.

AVIATION WEEK, August 10, 1950

How EDISON Indicators Save 35 Pounds



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SAFE OF OVERHEAT

High-speed coils—No diffusion heat—No heat sink required—No heat sink required.



SAFE OF OVERHEAT

High-speed coils—No diffusion heat—No heat sink required—No heat sink required.

EDISON electrical resistance temperature indicators were recently specified for cylinder head indicators on a new type of four engine transport. In this installation, two dual indicators and eight bulbs were used, at a weight saving of 35 pounds under the thermocouple system formerly employed.

Weight economy is only one of the many features associated exclusively with EDISON indicators. Of special interest to maintenance engineers is the ability of EDISON indicators to adapt themselves to any temperature measurement application. The EDISON indicator movement is available for all indicators whether used for cylinder head, oil, air, bearing, etc. This standardization permits the temperature range in any given indicator to be changed merely by substituting a new dial and a few low-cost resistors.

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Clamp Speeds Work

Speaker installation and servicing of aircraft instruments is speeded through use of a new mounting clamp produced by Munn's Products Co., Inc. Instruments now can be installed or removed from the dial (gauge) side of the panel. The clamp is installed by hand the instrument panel and centers the instrument instant. It is

actuated by a screw inserted from the dial side. Another screw on the face of panel indicates or locates the clamp which grips the instrument body. All that is required to remove the instrument is to loosen this actuating screw (from dial side), then pull the instrument out of the panel and disconnect whatever leads are attached. The clamp is designed to conform to Specification MIL-C-5318 and is installed as shown with Spec. MIL-C-6832.

Resists face rivet, fastener, clamps of this type permit close spacing of instruments, according to instrument engineers. They say they are particularly suitable for engine gauges of the type shown in the photo above—those with one square, four-holed mounting flange. It is a derivative of preexisting mounting things and the diagonal spacing of the clamp screws which permits instruments to be spaced closer. Unless a coverplate is used over the main panel, instruments project slightly from the panel so there is the threaded edge providing a hand grip permitting the gauge to be pulled out. Munn's address is 944 W. Florence Ave.,inglewood, Calif.



System Indicator

A remote reading three-position indicator suitable for a variety of aircraft applications has been placed on the market by the Keystone Watch Case Division of Keystone Metal Co.

The device consists primarily of a rotating card which exhibits one of three pointed symbols at an observation window on the instrument. The card is rotated by two solenoids which draw it up or down in either of two extreme positions. When neither coil is energized, the spring-balanced cylindrical card returns to central position, exhibiting the third (middle) symbol.

The indicator can be used to report

conditions in various aircraft systems where operation is adaptable to a three-position circuit, such as High, Low, Medium, for example. Slightly larger than a cigarette lighter, the unit weighs 7½ oz. and is designed to meet severe operating conditions in aircraft.

The marker uses the device already has been specified as a landing gear position indicator and for reporting de-icing fluid level and cabin air pressure. Keystone Metal Co., Roseland, N. J.



Air Photo Tool

An aerial photo slide rule, providing quick answers to problems arising in photo reconnaissance work, is being marketed by Pettitt & Eckel, Inc. While designed primarily for Air Force use, the rule is considered by the firm to be highly useful for commercial

aerial photography activities. The time-saving device, eliminating need for reference tables and slide rule calculations, was developed by AF's Aerial Photo Division. With five scales, the unit on one side solves aerial photography problems; reverse side is used for ground calculations. It gives fast answers to such problems as:

- Comparative size between objects on ground and in photograph
- Area of land covered by one exposure of film at a given focal length, altitude and film size
- Ground feet covered in flight per inch of photograph
- Exposure time in seconds required to cover image while plane flies at given mph, given height and camera set at given focal length
- Actual size of ground object appearing on photograph

The rule is available in 10- or 6-in. models priced \$22.25 and \$12.25 at respectively. Pettitt & Eckel, Inc., 5 South Walnut Ave., Chicago 5.

Small Avionic Mount

Smaller all-metal shock mounts meet all mounting mounting stringent weight and space restrictions being placed on aircraft avionics equipment have been added to the Met-Ek line.

The newest addition is a No. 3 type

cup and mounted high to conform with JAN-C-172A specifications. It meets the target No. 2 size metal mount mount Series 7802, previously produced in quantity by Reliance.

The new, smaller mounts come in five load capacities ranging from 4 to 10 lb. Maximum ultimate strength per unit is 750 lb. According to the firm, reliability indicates performance exceeds military spec requirements through heavier stress ratings from -130 to 347°.

Baltimore Aviation, Inc., Teretechon Air Terminal Television, N. J.

ALSO ON THE MARKET

Tough, long-lasting markers for identifying wires and cables are made of rigid plastic about 3/8 inch thick, have clear plastic windows to protect lettering on tag from (with cord) or sleeve (1/16 in. dia. minimum) to fit any shape. Avionics Craft Products, 8 September 1968 Dr., Fort Worth, Texas, N. J.

Spotlight for airports, landing areas, etc., is designed to provide 300,000 candlepower with only 300 watt rating. Give long throw, narrow beam-lighting beam. Stancor Electric Products Co., 468 Hoken, St. Elizabeth + N. J.



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AIR TRANSPORT



THE BUILDING—A symbol to Behndke, but a source of frustration to the pilots.

Revolt of the Pilots—II

Curtain Drops on One-Man Show

Behndke's preoccupation with a 'home' to give union of 'impetuous' pilots stability helped spark rebellion.

By William Kester

Airline management seeking a clue to future labor relations at the abrupt change of leadership at the Air Line Pilots Assn. is seeking one significant point: The revolt of the pilots was not against David L. Behndke, the strong pro and protector of pilots, but against Dave Behndke, the Labor Leader as seen above.

With the end of dominance of the union by a single personality, the airlines may find a better organized ALPA, one not necessarily easier to live with, but one perhaps easier to work with. (Aerowire Week Aug. 6, p. 15).

Management will find, as the revolt is examined, that the pilots quarrel with Behndke in no flight, but in action as well as things done. Some or some want will find that pilot movement against Behndke has been growing. And Behndke had been warned.

Behndke's "Pilot-Beheading" at the time, he says, will drive a nail in New York several years ago and meet an active protest. Also opposing of the state of the union, the airline president said, states Behndke, "ALPA will not destroy itself by the pilot's preoccupation."

Then there was the 1964 convention when, for the first time, Dave Behndke had supporters for the presidency, from American Airlines Captain W. H. Proctor. Behndke won by a substantial margin: that it was the cloud in the sky that loomed in the storm. It was only the younger element in the union that at that time Behndke did break. So long time ago, already had started turning from him.

And Behndke's wife, an acknowledged partner in his life, of building ALPA, advised him after their conversion to hurry and complete his "last plan," that it would be too late. That plan, Behndke explains, was a two-fold one.

• Departmentalization and decentralization of ALPA, so others could have the major responsibility for representing it.

• Complete the new ALPA headquarters from building.

But the pilots couldn't wait. By Behndke's side, they have been "preoccupied" in taking control of their situation. To understand what that is, you have to understand Behndke's attitude toward pilots. He explained it as American Airlines in the only employee interview he has granted since the crisis in ALPA above.

"The Behndke Story—Scattered on the heavy living room of his slightly old-fashioned, his back sagging on Chicago's South Side, Dave Behndke from some headquarters, Behndke turned his thoughts back to the course of the union. Pilots are well known in the cockpit, he began. "Everything I have said about them, God bless them, is true. But outside of the cockpit they can't run their own affairs."

"Pilot aren't business men. They want home they want. They're not business men of the union, and when they come home they are too tired to think about the ball on that one. It's the wife who pays the bill. It's the wife who says maybe they ought to buy that little piece of land against the city that she can't be moving."

"They say ALPA has been a one-man show. It had to be. Pilot aren't business men. They want home they want. They're not business men of the union, and when they come home they are too tired to think about the ball on that one. It's the wife who pays the bill. It's the wife who says maybe they ought to buy that little piece of land against the city that she can't be moving."

new men. They think they can run the union, but outside the cockpit they don't know anything."

Because Behndke sincerely believes that, he has been disposed and ALPA turned over to highly-educated pilots who say the times have passed Behndke by. Representatives today are in high school, have skills and knowledge on demand of in Behndke's days as a pilot, and either unaccompanied or accompanied by Behndke today.

Because Behndke sincerely believes that pilots cannot run the union, he was loath to lose the strong bonding him to a 24-hour working day for pilot welfare, and to personal supervision of the first draft. But he then disports that ALPA, far from being a one-man show, Behndke glances in that as the most serious approach to the organizational problem.

Because ALPA was a one-man show, the things left undone by Behndke were beyond. His ALPA motion was to lay up a lot of people, say a dozen, give each a priority and then work on them in order. By the time number 12 became number 1, there were perhaps 12 more waiting attention. Things were completely being left undone.

In recent years it had become worse. The main reason was the new ALPA building.

Behndke's of a House—David Lewis Behndke, in a way that only an agent could fully understand, at a humble pace, in the tropics of a union leader not he alone back from nothing. In his house on a quiet day, [he might be] was an agent, as his own way was, and captured in his belief in the agent's vision. But in his own way of course, respect for unionism, loyalty to your associates and employees. The area of others began with the home; the realm of permanency in life.

It is as remarkable that Behndke's construction of the new ALPA building, which according to his lights has been "disputed," is not a fact that leadership cannot understand how leaders of his elements under a home which means of them are ALPA not only cannot afford, but that not necessarily need to operate efficiently.

It has been said that Behndke is building a building that shows other while building itself in Chicago's Midway Airport with his own hands. An imagination, of course. But he does say he sketched the floor plan after the architect had laid. He does say he had to be on the job every day to understand the construction. "Owner's decision they tell it and if I'm not there to make the decisions, several areas will get stuck around."

Construction of the building was essential to completion of his grand plan. To use with David Behndke's vision, an imagination has no permanency will



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lined a DC-4 to Twentieth Century Airlines for one year ... CEA is flying back the Atlantic and Pacific under military contract.

►Capital Airlines-Carter earned a net profit of \$778,300 or \$2 cents a share the first half of this year, compared with \$335,791 a year ago. Operating profit of \$1,548,849 or revenue of \$18,598,387 compares with last year's \$614,580 or average of \$8,644,346 the first half.

►Confidential Air Lines-CAL, netted \$216,349 or 68 cents a share the first half, compared with \$1,456 a year ago. Company gives a large share of assets for this to charter revenue.

►Flying Tips Line-Air flightless has bought 740 feet of property on Sherman Way in Reseda to build a \$145,000 office building. Tips has a contract with the U.S. Department of Commerce to move about 7,200 to 70,000 Mexicans departing a month later to Mexico up to Sept. 16. Maximum revenue on revenue for the service is \$1,500,000. Grace requests for the fiscal year ended June 30 are estimated at \$16 million, with profit margin of \$2,900,000.

►KLM Royal Dutch Airlines-KLM is flying routes and routes from Europe to New York on specially designed routes in a light world line. This eliminates routing, pricing, loading. First week on our service brought in over 400 cargo designed in Paris and made in Holland.

►Finnair Air Lines-Finnair affiliate has the first CAA-designated foreign airports (status certificate issued in South America).

►Pan American World Airways-PAA has added for an off-season roundtrip fare of \$136 to Houston from the West Coast-between Oct. 15 and Dec. 20. United has filed for the same. Regular fare roundtrip is \$135.

►United Air Lines-UAL earned a net of \$7,917,358 or \$1.31 a common share the first half, compared with a loss of \$59,170 or 13 cents a common share a year ago. Net operating revenue an increase of \$58,220,916 or \$7,604,514 a year ago, or average of \$46,562,652, UAL's operating income was only \$167,248 the first half. Second quarter earnings at \$5,585,774 or 71 cents a share compared with \$3,594,501 a year ago. Main reason for the sharp increase, Revereview need reduction of \$897,067 after taxes, ten-day pilot strike in June. But revenues topped any one unit carrier in United history at \$30,436,357, compared with \$26,028,042 a year ago.



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LETTERS

PAA vs. Grace

Too many "CAR letters on Mexico letter changes" (Aviation Week July 30) seem to be a little clarification. It began "The Associated Airways' fleet at 41, offering Pan American's Grace Airways." A schedule of some 30 routes posted out before, there is no market between Pan American and Grace. The conflict is between Pan American and the Grace membership national.

Pan American was the earliest opponent of a schedule for the various carrier passengers in a change of place at Mexico. The agreement for a domestic route between New York and Mexico so that Pan American and Grace planes could continue on from Latin America to the northeastern United States. We have vigorously pointed out some very strong points to it in going about this week's scheduled improvement in service.

When National's suddenly expanded its agreements involving a PAA and Grace interchange, we pointed out a firm contract with United Air Lines to refer the case for PAA and some PAA rights. The agreement, vigorously supported by PAA, is now before the Board for approval.

John Connor, Vice President, Mexican Pan American World Airways Section 135 E. 42 St. New York 17

Guest's Control

The undersigned on the afternoon the American Coast, 8 A.M., in the air. We have been assigned to call to your attention an article appearing in Aviation Week July 2. The statement appearing in the magazine is, "American Coast, which has itself in Mexico International Airways, although it is owned and operated by American Coast, an American airline, is false in fact. It is a violation on the integrity of the company is that it implies that the company management its own and operates under false pretenses. The statement is also a charge that the company operates in violation of the Mexican laws under which it is incorporated, which implies that the company is illegally owned and mismanaged by Mexicans outside under penalty of sanction."

The facts are that the company of the company's stock is owned by the majority of its directors are Mexican nationals. Under the circumstances, therefore, we request that you make a letter of apology to our club ... so that it may be published at the Ministry of Communications of Mexico.

Enrique F. Flores,
Don, McGill, Huber & Noriega
New York 6

(The day in question came from one of our Mexican correspondents. We have asked him to comment on the story and the letter above. We are publishing this letter, although the correspondence's reply has not yet been received—E.C.)

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LARGEST "PEACETIME" MILITARY BUDGET

—That is how the press described appropriations submitted to the House of Representatives last week. Those included nearly \$15 billion for air power.

Observers on Capitol Hill expected generally favorable consideration of certain items. The representatives of the people showed little inclination to "vote" on the Comstock bill for a cease-fire Korea. Defense Secretary Marshall's entry explosion many days earlier over a "tragic and humiliating" let-down reaction of the American people to Red Mide's heavy words was as a capital as they were unnecessary. The people are sold on military strength for the U. S. and will brook no sensible curtailment of it. As far as air power is concerned, the nation is far ahead of its "leaders." Now do we believe the people will stand still idly for any artificial "dollar for Army, dollar for Navy, dollar for Air" kerosene piles.

We shall not forget, either, that it was Gen. Marshall who admitted publicly recently that if it were desired that cuts must be made in funds, he would prefer them to be carved out of our own U. S. military budget instead of forcing one financial aid to our European allies. Perhaps we should regret that we have only one country to give up to the Europeans. This kind of language is difficult for some Americans to take, especially from the "leader" who happens to hold the title of Secretary of Defense.

GOOD LUCK TO THE AIR RACES—For reasons that bother us, the National Air Races are being postponed this year. We hope, at least, that participation of only this month in this Detroit edition will in some way affect the public favorably toward air power. We also pray that as many good citizens and pilots will be alive at the end of the two-day Bureau holiday as when it started.

TURNING-POINT LEADERSHIP of this country over Great Britain still is not generally realized by the press and public here. Now, before the British exhibitions at Farnborough next month, would be a most favorable air companies engaged in turnkey work to make some new progress reports for public consumption. If they wait until after Farnborough, the papers will be too full of more news about British superiority over us in straight jets. Many more U. S. industry leaders will be going to Farnborough this year than ever before.

ANOTHER LOOK AT FLYING BOATS will bring a few kinks to the taxpayer since Navy and Consolidated Vultee men think they will be watching those new four-engine turnkey boats that Navy has ordered.

Except perhaps for dirigibles, flying boats have suffered most in the services' general reluctance to start the military air transport problem squarely in the face. Entirely apart from combat possibilities, the flying boat may still open up new vistas of military air transport. Does the Navy's lone old and exhausted Martin Marquis ship still running up a ten mile cargo record between the West Coast and Pearl Harbor that has received too little publicity. Radical improvements in hull and wing, combined with the new turnkey power, may put the new Convair flying boats in the top class for some time to come. The Navy deserves consideration for sticking to its guns on the flying boat subject.

WITH ALL THE PRESS RELATIONS EXPERTS

that the Air Force has, they should have done a better job of unconfusing the public on the most subject of groups and wings. But in fact so. From the Secretary of Air on down, the preferred terminology is "wing," and not "group."

The group is a flight unit of combat planes only. But each group is supported by such non-plane units as an air-base group, a medical group, and maintenance supply group, all of which form a wing.

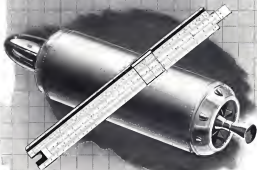
When you get to analysis of planes in a group, you begin to enter obscurity. The last report we had is that a heavy bomber group comprises not more than 70 planes. Medium bomber groups may have 30 to 45 planes plus some flying tankers. The official number of ships in a light bomber group is 48. But these figures vary downward. A group may be operating at less than full strength. But it's still a "group." So that you can't possibly compute accurately the number of operational planes in the Air Force even if you know the current group strength.

Although the press considered it surprising, students of American Wars didn't when it was revealed on Capitol Hill the other day that the USAF had only 37 B-56 in service while 60 others were on the ground being modernized.

Last June S. Averescu Wink reported that the backbone of the USAF long-range striking force is still the modified bomber of the late war—mostly improved B-29 and B-50. "Despite widespread publicity of the big new engine B-36 as a weapon in being, few of these are operational at the present time although well over 100 have been built. . . . today SAC has three B-36 bomb hardpoint groups, none of which is completely equipped, and a fourth group is due for conversion." Last February AW had told you, "Three of the 14 (SAC) groups are equipped, although not completely, with the B-36. . . . If they had been completely equipped, there would have been 90 of the big bombers ready in action. But these weren't that many then, and there aren't now."

—Robert H. Wood

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Here's why THE NEWEST AND BIGGEST AIRLINERS ARE BEING EQUIPPED WITH G-E ELECTRICAL SYSTEMS



Lockheed's new model Constellations, and all Super-Connies use General Electric protective systems. G-E provides the fastest possible tripping of overvoltage faults—and freedom from nuisance tripping.



G-E provides the only positive method of isolating a faulty generator without effecting service. That's one reason why all of Pan American's Boeing "Strato" Clippers use G-E systems.



New Douglas DC-6B's being built for Pan American World Airways will be equipped with G-E electrical systems. G-E provides the most complete electrical protective systems ever placed in production for commercial transport-type aircraft.



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